





THE EFFECT OF SUBSTITUTING THE DD FORM 250 ACCEPTANCE RATE FOR ACTUAL PRODUCTION RATE WHEN PREDICTING DIREC[®] LABOR REQUIREMENTS FOR MISSILE PRODUCTION PROGRAMS

Giles D. Gentry, Jr., Captain, USAF

LSSR 97-83

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The addition of the production rate variable to the standard learning curve model has been validated as a significant improvement in estimating direct labor hours for airframes, avionics equipment, aircraft engines, and missiles. This research set out to determine if acceptance rate of the end item could serve as a reliable proxy for the production rate variable when production rate data are not available to the researcher. Acceptance rate, as reported on DD Form 250, was substituted for production rate data in a replication of research on the Maverick missile program. Research results failed to support the reliability of the acceptance rate proxy for this program.

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THE EFFECT OF SUBSTITUTING THE DD FORM 250 ACCEPTANCE RATE FOR ACTUAL PRODUCTION RATE WHEN PREDICTING DIRECT LABOR REQUIREMENTS FOR MISSILE PRODUCTION PROGRAMS

A Thesis

Presented to the Faculty of the School of Systems and Logistics of the Air Force Institute of Technology Air University

In Partial Fulfillment of the Requirements for the

Degree of Master of Science in Logistics Management

By

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September 1983

Approved for public release; distribution unlimited This thesis, written by

Captain Giles D. Gentry, Jr.

has been accepted by the undersigned on behalf of the faculty of the School of Systems and Logistics in partial fulfillment of the requirements for the degree of

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MASTER OF SCIENCE IN LOGISTICS MANAGEMENT (CONTRACTING AND MANUFACTURING MANAGEMENT MAJOR)

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B. Weaver Pha

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CHAPTER I

INTRODUCTION AND OVERVIEW

The learning curve has been used extensively in the aircraft industry during the last thirty years to assist in cost estimating for major DOD weapons acquisition programs. Since the introduction of the basic learning curve model, a number of variations have been developed in an attempt to achieve a greater accuracy in predicting actual \cos^{+} figures [7:6].

The post-World War II years constitute an era of increasing complexity in Department of Defense (DOD) weapon systems acquisitions. Although primary concern has centered on the effective and efficient use of taxpaver dollars, numerous obstacles make this objective difficult to achieve. Tremendous leaps in technology have resulted in weapon systems of previously unimaginable complexity and cost. Further complicating the issue is the need to plan the acquisition and use of these weapon systems over as much as a twenty-year time span with money that is appropriated one year at a time. Even more uncertainty has been added by shocks to the U.S. economy in the form of (1) inflation, (2) increasing cost and questionable availability of energy, and (3) increased competition from foreign countries (2:1).

These conditions contribute to cost overruns in DOD weapons systems acquisitions and clearly illustrate the need for more precise techniques to estimate weapon systems cost. The experience of industry and the DOD

indicates that direct labor is a significant determinant of cost. This research will focus on developing a more accurate way to estimate direct labor costs, and, more specifically, the effect of the absence of production rate data on estimating these direct labor costs.

LIMITING THE PROBLEM

At the outset of a major DOD production program, a tentative monthly production schedule for the life of the program is negotiated between the contracting parties. This schedule permits planning for such items as work force build-up, facility and tooling needs, and the ordering of long lead items. Although the planning delivery schedule covers the life of the program, formal contractual agreements between the DOD and manufacturers usually cover only annual delivery requirements. Delivery requirements for subsequent years are funded through the exercise of options or separate contracts as funds are appropriated by the Congress (14:2).

These multiple year programs may result in a need to change the production rate. For example, when funding for a particular year is insufficient to cover the production schedule under an existing production plan, it may be necessary to stretch out the production over a longer time span. A national emergency or changed mission requirement

may dictate an accelerated rate of production. When such changes in delivery schedules are required, changes in cost estimates are also required to support contract negotiations and additional funding requests. It is suggested that the rate of production is an important independent variable that can be used to help project the change in unit costs due to either program accelerations or decelerations (14:2). In some instances, however, when actual production rate data are not available, it is not known if a reliable proxy exists to serve for these data.

Industrial and government cost estimators have traditionally used learning curve techniques to estimate direct labor hours required in production (4:25). Learning curve theory is derived from the relationship between the cumulative number of units produced and the number of direct labor hours required for production. In other words, as a worker produces more of a gived item, a certain amount of "learning" (proficiency) occurs, and the number of hours required for production tends to decrease in a regular pattern. Learning curve theory is based on the following assumptions:

(1) The production item should be sizeable and complex and should require a large amount of labor.

(2) The majority of assembly operations should not be mechanized or machine-paced.

(3) Learning curves applied from past experience should be adjusted for any differences in items, processes, or other aspects of production.

(4) The production process should be a continuous one and the item and product changes kept to a minimum.

(5) Historical data should be available to compute the curve, since estimated data have low reliability.

(6) There should be no external production rate changes (4:231).

The last assumption is unrealistic for DOD weapon systems acquisition. Changes in production rate are forced on DOD activities quite often. There has been considerable research conducted to correct this apparent limitation of the standard learning curve model (2:4). These studies will be discussed later in this chapter.

One of the most promising studies, by Larry L. Smith, resulted in a model for airframe production which improved the basic learning curve model through the addition of a production rate variable. Smith's methodology has been replicated for aircraft avionics, engines, and missile systems to determine its validity in other types of production. Further replication, using proxies as a substitute for the actual production rate variable is warranted, and forms the basis of this research effort.

STANDARD LEARNING CURVE MODEL

T. P. Wright is generally regarded as the pioneer of learning curve After theory. his initial research. learning tables curve were used at McCook Field. Dayton, Ohio as early as 1925 (5:49-50). Wright's 1936 article on the application of the learning curve to aircraft manufacturing cost estimation is widely regarded substantive effort in mathematically as the initial learning modeling the phenomenon for aircraft manufacturing (16:2D26). As a result of increased aircraft production during World War II, the U.S. Government sponsored a statistical analysis by the Stanford Research Institute on World War II airframe direct labor data. The Stanford study resulted in two important achivements: (1) it confirmed the learning curve effect on World War II production, and (2) it demonstrated the value of a learning curve model for use in cost analysis (16:2D26-27).

It can be intuitively discerned that for labor production processes which are repetitious, each successive equivalent unit of production will require fewer direct manhours, and that the manhours required decrease at a decreasing rate. This phenomenon, known as the learning or experience curve, has two basic variations. The variation validated by the Stanford study is known as the "unit curve" or the "Boeing theory", and can be expressed mathematically by the formula:

 $Y = AX^{b}$

where:

Y represents the direct labor hours for the "xth" unit.

- X represents the total number of units manufactured in the process,
- A represents the number of labor hours to produce the first unit manufactured in the process, and
- b represents the slope parameter or a function of the improvement rate [2:7].

The slope of the curve can be expressed as a percentage, which is the ratio between the per unit cost at any unit and the percent cost at double that number of units [3:199].

The "cumulative average" or "Northrop" variation (described by Wright in his 1936 article) measures the average cost for X units rather than the cost for the xth unit. Its mathematical form is:

$$\overline{\mathbf{Y}} = \mathbf{A}\mathbf{X}^{\mathbf{B}}$$

where:

Y represents the cumulative average cost of all production up to and including the xth unit.

The other parameters are the same as for the unit curve theory [2:7].

While the Boeing and Northrop models can be manipulated in the same manner, the user should be aware of the difference between the unit cost and the cumulative unit cost measured by these respective models [7:7-9].

As stated above, the basic learning curve model can be manipulated by either unit cost or cumulative unit cost. The unit learning curve (unit cost) of the basic learning curve will be the model used for the remainder of this paper. Also, for purposes of this research, the basic learning curve model will later be referred to as the "reduced model."

Limitations of the Standard Learning Curve Model

Probably due to its simplicity, intuitive appeal, and long history, the basic learning curve model is still widely used. However, the learning curve model does not take into account the exogenous changes in the rate of production. Those exogenous changes are a concern to researchers because of their effect upon the total direct labor requirements.

Concern about exogenous changes in production rate is justified by the following factors: (1) workers will adjust according to pressure to speed up or slow down production; (2) as more workers are employed, the distribution of tasks to each individual worker should narrow; and (3) at higher production rates, tooling costs and set-up costs can be more widely allocated to larger number of units.

Fiscal prudence dictates that each echelon within DOD strive for accurate cost prediction in order to budget, manage, and control. It naturally follows that the importance of production rates in cost estimating must be investigated fully, and that DOD buyers must consider the effects of production rate changes throughout the acquisition process [15:11].

HISTORY OF EFFORTS TO ADD PRODUCTION RATE VARIABLE

The focus of this research involves the addition of the production rate variable, in the form of a proxy, as a second independent variable in the learning curve model. This section will present a chronological history of some of the more important work that has been done in this regard. The list is not exhaustive, and is intended only to provide the reader with a summary of the most widely recognized research efforts in this field. Not all researchers have agreed as to the usefulness of the production rate variable. However, recent efforts show

great promise for the production rate to aid in more accurate predictions of labor requirements. If this research effort substantiates the contention that a proxy can be used in place of the production rate variable in the learning curve, DOD researchers will have the opportunity to complete research efforts where the production rate variable is not available.

Harold Asher (1956)

Asher examined the relationship between cost and quantity in the airframe industry. Using empirical data from several airframe production programs, he subjectively evaluated the effect of the production rate on direct labor hour requirements. Asher identified two ways in which the production rate could affect unit labor cost. First, it can affect the amount of machine set-up time charged to each unit of production. Second, it can affect the number of subassemblies in the manufacturing process, which, in turn, affects the number of hours of subassembly work charged to each unit. He concluded that production rate was not very important as a predictor when compared to the effect of cumulative production (3:86-87).

Alchian and Allen (1964)

Alchian and Allen advanced the idea that production cost is dependent on three production variables: (1) total volume of the item to be produced, (2) production rate,

and (3) amount of time from the decision to produce until the first output occurs (14:19). They drew three major conclusions. First, larger total volumes lead to smaller unit costs because of increased product standardization that accompanies larger volume. Second, unit costs increase with increasing production rates because more overtime and less efficient workers are needed to support the increased production rate. Third, the cost variable increases if the initial production start-up time is compressed. They explained that less efficient procedures are used than if time were allowed to prepare properly for production. Subsequent effort expended to correct these inefficiencies results in higher unit costs (1:308-322).

Although Alchian and Allen did not test their conclusions on actual data, their ideas may have application to the airframe industry (14:20).

Gordon J. Johnson (1969)

Johnson predicted labor requirements for rocket motors using an additive model which considered both the rate effect and the learning effect. The model he used was:

$$y = A + BX_1 + CX_2^Z$$

where:

y represents direct labor hours per month,

- X₁ represents production rate in equivalent units per month,
- X₂ represents cumulative units produced as of the end of the month, and

A, B, C and Z are model parameters.

Johnson regressed this model against four sets of rocket motor data. His results are shown in Table I. As depicted in the table, Johnson had good results (high R²) with data sets 1 and 4, fair results with data set 2 and poor results with data set 3. Johnson explained data set 3's poor results as being due to an inadequate accounting system used by the manufacturer. He concluded that the production rate is a significant determinant of direct labor requirements [7:10].

Joseph A. Orsini (1970)

Orsini (12:57-80) tested Johnson's rocket motor model using airframe data from the C-141 program. He employed the following procedure: (1) regression analysis was performed on the data using the standard unit learning curve model, (2) regression analysis was again performed using Johnson's three dimensional additive model that incorporated rate of production, and (3) analysis was performed after converting Johnson's additive model into a multiplicative one which is stated as follows:

$$Y = e^{B_0} \cdot X_1^{B_1} \cdot X_2^{B_2}$$

where:

Y represents the direct labor hours per quarter,

X₁ represents the number of units produced per quarter,

X₂ represents the cumulative number of units produced as of the end of the quarter,

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SUMMARY OF JOHNSON'S REGRESSION ANALYSIS

	Coefficients of Determination (R ²)								
Regression Variables		Data	Set						
	1	2	3	4					
Labor Hours vs. Cumulative Units	. 753	. 395	.0067	.763					
Labor Hours vs. Cumulative Units and Production Rate	. 932	.808	. 308	. 927					

Source: [9:34].

B_0 , B_1 , and B_2 are model parameters and e is the base of the natural logarithms [2:11-12].

Orsini concluded that (1) inclusion of the production rate as an independent variable significantly improved the predictive ability of both the additive and multiplicative models, and (2) the multiplicative model performed better as a predictor than did the additive one because it eliminated the need to estimate the parameter Z (12:71).

Large, Hoffmayer, and Kontrovich (1974)

During an effort to develop a general model, Large, and Kontrovich examined data from Hoffmayer, major airframe acquisitions relating to the effect of production rate on cost. The model used, according to Smith of the (14:29-30).is form:

 $Yi = A \cdot w^B \cdot s^C \cdot r^D$

where:

- Yi represents the cumulative direct manufacturing fabor hours through unit number i,
- w represents the program average Defense Contractor Planning Report (DCPR) weight expressed in pounds,
- s represents the maximum design airspeed in knots,
- r represents the production rate expressed as the acceptance span in months for the first i airframes.

(For their investigation, Large, Hoffmayer, and Kontrovich chose i arbitrarily to be 100 or 200), and

A, B, C and D are model parameters [2:12].

Large, Hoffmayer, and Kontrovich concluded that the effects of the production rate could not be predicted with confidence, especially in the early stages of a major acquisition. They concluded that each case must be considered separately (10:50-51). Smith (14:31) indicated that the use of an acceptance span as a proxy for production rate masked the true effect of the production rate because of the resultant averaging effect.

Joseph Noah

Noah analyzed cost data to find the effect of production rate on airframe costs. His model for the data was:

$$\mathbf{y} = \mathbf{e}^{\mathbf{A}} \cdot \mathbf{x}_{1}^{\mathbf{B}} \cdot \mathbf{x}_{2}^{\mathbf{C}} \cdot \mathbf{x}_{3}^{\mathbf{D}}$$

where:

- y represents average direct labor hours per pound of airframe for each airframe lot,
- e is the base of the natural logarithm,
- X₁ represents the cumulative volume in pounds of aircraft produced by the midpoint of each airframe lot,
- X₂ represents the production rate in average pounds of airframe delivered per month for the entire period,
- X₃ represents the annual volume of aircraft in airframe pounds, and

A, B, C, and D are model parameters.

Noah averaged the estimated regression coefficients from two sets of data, one on the F-4 and the other on the A-7, and tried to develop a generalized cost model. Smith felt

that this approach was questionable and that the model needed to be tested on additional aircraft programs to determine if it did actually serve as an accurate predictor. Also, Smith stated that while the lot average airframe delivery rate was a practical representation of the production rate, the average delivery rate variable appeared to lag the average expenditure of hours required to produce the airframes delivered [7:10,12].

Larry L. Smith (1976)

Smith developed a model for airframe production that included a production rate variable to test the idea that production rate changes can explain changes in direct labor requirements (14:35). He adapted a modified version of Orsini's multiplicative model as follows:

$$Y_{j} = B_{0} \cdot X_{1i}^{B_{1}} \cdot X_{2i}^{B_{2}} \cdot 10^{e_{j}}$$

where:

- Y_i represents the unit average direct hours needed to output each pound of airframe in lot i,
- X_{1i} represents the cumulative learning accrued from experience on all airframes of the same type through lot i,
- X_{2i} represents the production rate of lot i for all airframes of the same type,
- e, represents the variation of each dependent variable which is not explained by the two independent variables,

B₀, B₁, and B₂ are parameters in the model [14:43].

Smith also linearized the model to facilitate multiple linear regression. The linearized form was:

 $\log Y_{i} = \log B_{0} + B_{1} \log X_{1i} + B_{2} \log X_{2i} + ei (14:45).$

To test the accuracy of his model versus the standard learning curve model, Smith employed a "reduced" model which was merely his model, or "full" model, minus the production rate variable. The "reduced" model was a unit learning curve model as follows:

$$Y_i = B_0 \cdot X_{1i}^{B_1} \cdot 10^{e_i}$$
 (13:43).

Regression of historical data with each model allowed Smith to identify the contribution of predictive ability by the production rate variable (15:17-18).

Evaluating data from the F-4, F-102, and KC-135 airframe production programs, Smith reached the following conclusions: (1) in each case, the production rate variable was negatively correlated with unit direct labor requirements, (2) both proxies to the production rate variable were important contributors to the full model's predictive ability, and (3) as evidenced by the R^2 values he obtained, the full model more closely fit the data than the reduced model (14:142-146). Tables 2 and 3 summarize Smith's regression analysis and predictive ability test results.

Congleton and Kinton (1977)

Using the same methodology, Congleton and Kinton replicated Smith's research for the T-38 and F-5 airframe

production programs. They reached the same basic conclusions as Smith; however, in one of the thirty test situations they reported that R^2 was higher for the reduced model than for the full model, but by less than one percent (6:91-93).

Stevens and Thomerson (1979)

Stevens and Thomerson replicated Smith's model for aircraft avionics systems. Specifically, they examined the Magnavox ARC-164 radio, applying the methodology set forth by Smith. Stevens and Thomerson formed the following conclusions: (1) production rate was a significant factor in explaining variations in direct labor hours in nine out of ten cases, (2) the predictive ability of the full model was better than that of the reduced model for eighteen months into the future, (3) the standard learning curve (reduced) model consistently overestimated direct labor hours while the full model stabilized predictions over an extended interval, (4) regression coefficients are unique to the program for which they are derived, and (5) the overall applicability of Smith's model has wide potential and can be tailored to various other programs (15:102-104).

Crozier and McGann (1979)

Crozier and McGann also replicated Smith's research. They applied both the reduced model (standard learning

TABLE 2

‡ ;;

SUMMARY OF SMITH'S REGRESSION ANALYSIS[†]

Test Situation Number	Data Points	Rf (actual)	Rr (actual)	Bo	B ₁	B2
÷	57	0.978	0.928	masked*	-0.261	-0.169
N M	55 57	0.966	0.904	: =	-0.257	-0.161
4	42	0.853	0.585	=	-0.230	-0.157
ŝ	42	0.820	0.585	= (-0.229	-0.136
9	42	0.889	0.618	6.328	-0.221	-0.148
7	42	0.851	0.618	7.601	-0.219	-0.127
œ	42	0.744	0.658	9.016	-0.279	-0.112
6	42	0.733	0.658	10.400	-0.278	-0.097
10	50	0.979	0.961	38.371	-0.299	-0.158
11	42	0.979	0.959	47.290	-0.344	-0.144
12	96 96	0.958	0.971	13.133	-0.453	-0.164
135	7	0.974	0.903	0.674	-0.165	-0.305
145	2	0.971	0.903	1.123	-0.233	-0.222
155	7	0.994	0.964	13.338	-0.608	-0.361
165	7	0.992	0.964	7.303	-0.527	-0.262
*The tota turer, a research †Smith's recapped	tl product ind these (15:65), methodolc l in Chapt	tion hours pe coefficients Sgy, producti ters II and l	er pound were s were masked lon rate proxi [II of this re	considered pr in the publis es, and R ² ve search. The	oprietary by th hed version of rsus R ² (actual subscripts for	te manufac- Smith's .) are all R2 are as
follows: §Impracti	f stand cal for 1	ds for full n test situatio	nodel; r for t Dns.	he reduced.	·	

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Source: [2:16].

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TABLE 3

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SUMMARY OF SMITH'S PREDICTIVE ABILITY TEST RESULTS

Test Situation Number	Percentag	ge Deviation*
	Full Model	keduced Model
1	-2.6	14.5
2	2.2	13.6
3	Not Reported	13.6
4	1.8	5.3
5	3.1	5.3
6	-7.8	Not Reported
7	+	Not Reported
8	-0.7	1.1
9	-4.2	1.1
10	-1.1	5.6
11	3.5	Not Reported
12	2.2	-3.3
13-16	5	§
These tests were cond of this research. Al nearest tenth.	ucted as describ l percentages ar	ed in Chapter II e rounded to
Smith reported the re- than those for test s a value (14:96).	sults were devi	ations greater did not report

§Smith reported that predictive ability tests were impractical for situations 13 through 16 because observations were limited to seven (14:71-131).

Source: [2:16].

curve) and the full model to three aircraft engine programs: (1) the General Electric J-79, (2) the Allison TF-41, and (3) the Pratt and Whitney F-100. They found that the production rate significantly explained variation in direct labor hours in three of the six cases examined, with especially good results on the F-100 engine. On engine programs, the full model was a better predictor than the reduced model. Crozier and McGann concluded that the results when using Smith's model depend a great deal on the type of weapons system. This last finding justifies the need for more replication efforts of Smith's model (7:92-94).

Allen and Farr (1980)

The findings of Allen/Farr are crucially important to this research effort. They replicated Smith's model for the Maverick and SRAM missile programs, utilizing twelve models in their research methodology. Smith's model was replicated for the fabrication, assembly, and test components of the two missile programs and Allen/Farr concluded that the production rate was found to explain a significant amount of variation in direct labor hours in nine of the twelve models examined. Enough support was evident to conclude that the production rate variable should be considered when evaluating missile production programs. Whereas Allen/Farr used the production rate as the second independent variable in the full model, this research will use their data and substitute a proxy for the production rate variable. This substitution will test the reliability of the proxy as a substitute when production rate data are not available. The details of this proxy and its application to the model are discussed later in this paper.

RESEARCH PROBLEM STATEMENT

Past research efforts have shown that changes in production rate affect direct labor hours for continuing weapon systems production programs. These past research efforts used the number of end items completed during an accounting month as their measure of production rate. This measurement of production rate is not always accessible for the following reasons: (1) the contractor may be unwilling to furnish the data, or (2) the contractor may not collect the data in a format suitable for use in learning curve analysis. Whenever the actual production rate data is not available, a proxy must be employed in its place. One easily accessible proxy for actual production rate is the DD Form 250 acceptance rate. This form is always used in DOD weapon system production programs to document end item acceptance and is readily available to DOD researchers. The use of a proxy, such as

the DD Form 250 acceptance rate, in lieu of actual production rate data in predicting direct labor hours for continuing weapon system production programs is not known.

RESEARCH OBJECTIVE

The objective of this research is to determine if the DD Form 250 acceptance rate can be substituted for the actual production rate variable contained in Smith's model without compromising the predictive ability of that model.

RESEARCH HYPOTHESIS

The predictive ability of Smith's model is not compromised by the substitution of the DD Form 250 acceptance rate for the actual production rate variable.

PLAN OF DEVELOPMENT

With the problem narrowed and the objective outlined, the next chapter is devoted to a discussion of the methodology for testing the research hypothesis. A brief summary of assumptions and limitations about the close Chapter II. Chapter III will methodology will contain the data analysis and evaluation. Finally, Chapter IV will contain the summary, conclusions, and recommendations of this research.

CHAPTER II

RESEARCH METHODOLOGY

This chapter outlines the procedures used to test the research hypothesis. The chapter is divided into five sections as follows:

- (1) Restatement of Objective,
- (2) Model Definition, Variables, and Assumptions,
- (3) Data Collection,
- (4) Analysis Methodology, and
- (5) Summary.

RESTATEMENT OF OBJECTIVE

The objective of this research is to determine if the DD Form 250 acceptance rate can be substituted for the actual production rate variable contained in Smith's model without compromising the predictive ability of that model.

MODEL DEFINITION, VARIABLES, AND ASSUMPTIONS

Model Definition

Chapter I discussed the two models used by Smith, which he called the "full model" and the "reduced model." For ease of reference, the two models are repeated.

The reduced model is the basic learning curve stated as:

$$Y_i = B_0 \cdot X_{1i}^{B_1} \cdot 10^{e_i}$$
In the full model, the production rate variable is added as follows:

 $Y_{i} = B_{o} \cdot X_{1i}^{B_{1}} \cdot X_{2i}^{B_{2}} \cdot 10^{e_{1}}$

Model Variables

The three variables used in this analysis were: (1) direct labor hours per missile produced, (2)cumulative number of missiles produced, and (3) the DD Form 250 acceptance rate as a proxy for the missile production rate. Since it was considered desirable to improve the ability to predict the direct labor hours required per missile, direct labor was treated as the dependent variable. Cumulative missiles produced and the acceptance rate were considered the independent variables. The Direct Labor Hours Variable. Direct labor is usually measured in hours, although it is occasionally measured in dollars. Whenever the data are expressed in dollars, care must be taken to accurately account for inflation. The primary determinants of total direct labor are (1) fabrication labor, (2) assembly labor, and (3) test labor. Depending on the individual contractor, the data may be expressed as total labor or any combination of the component parts (fabrication, assembly, and test). The exact measure of the data is unimportant as long as a consistent unit of measurement is maintained (2:21). This

research will measure total direct labor in hours. Referring again to the reduced and full models, direct labor is depicted by the variable Y_i . Y_i represents direct labor hours required for each missile, where:

 Y_t = total direct labor hours per accounting month, Y_{tu} = unit index portion of total direct labor hours

- Y = unit index portion of total direct labor hours per accounting month,
- Y_{tsh} = standard hours portion of total direct labor hours per accounting month,
- Y_f = fabrication direct labor hours per accounting month,
- Y_{fu} = unit index portion of fabrication direct labor hours per accounting month, and
- Y_{fsh} = standard hours portion of fabrication direct labor hours per accounting month.

<u>The Cumulative Output Variable.</u> Records are normally kept for the number of missiles completed each month. The cumulative output is the total number of missiles completed since the beginning of the production program as of the end of a specific accounting month (2:22). The cumulative output variable is depicted by the variable X_{1i} and represents the cumulative output of all missiles through the ith.

<u>The Acceptance Rate Variable.</u> The production rate is the number of missiles completed during an accounting month. For some production processes, the production rate is difficult to accurately assess. Whenever this situation occurs, a proxy must be developed for the production rate.

Commonly used proxies are the delivery rate and the acceptance rate (2:22). The production rate variable used in this research effort will be the missile acceptance rate, earlier referred to as the DD Form 250 acceptance rate. The acceptance rate is depicted by the variable X_{2i} and represents the acceptance rate of the missiles in group i.

<u>Miscellaneous Variables.</u> e^{i} represents the variation which is left unexplained by the variables in the model and $B_{o}^{}$, $B_{1}^{}$, and $B_{2}^{}$ are the regression coefficients for the model.

In order to use multiple linear regression to analyze the two models, they were transformed to a linear form by taking the logarithm of each term. The logarithmic form of the reduced model is:

 $Log Y_{i} = Log B_{0} + B_{1} Log X_{1i} + e_{i}$

The logarithmic form of the full model is:

 $\log Y_{i} = \log B_{0} + B_{1} \log X_{1i} + B_{2} \log X_{2i} + e_{i}$.

Assumptions

The statistical significance of the results of the regression will be tested using appropriate F-distribution statistics. To establish the validity of these tests, it is necessary to make some assumptions concerning the error terms in the model. First, the error terms are assumed to be normally distributed with a mean of zero and equal variance. Second, the error terms are assumed to be independent of each other and of the independent variables (11:30-31).

A third assumption concerns a problem which frequently develops in multiple linear regression, that of multicollinearity. Multicollinearity exists when there is a high correlation between or among independent variables, this research are cumulative output which in and acceptance rate. If a strong correlation exists between or among independent variables, the F-test may find the marginal contribution of one or more variables to be statistically insignificant when, in fact, they may be good explainers of variation in the dependent variable if considered separately (11:341).

While multicollinearity can be a serious problem if the model is to be used for control, it is not as serious a problem when the purpose of the model is to predict, as is the case in this research (11:342). The contribution made by adding the acceptance rate to the reduced model will be subjectively evaluated by comparing predictions of the reduced model to those of the full model. Therefore, it is assumed the varying degrees of multicollinearity will have no substantial impact on the short-range predictive abilities of the models (2:24).

DATA COLLECTION

As in all previous research using Smith's model, accessibility of data is a very important determinant in selecting the particular program to be studied. The data must be the actual historical data rather than estimates. The data represents a census rather than a sample and statistics derived for each individual population are, therefore, descriptive of only that population. Consequently, the information derived is applicable only to the program being studied in this research. The regression coefficients found in this research must not be indiscriminately applied to other missile production programs.

The data furnished by the Hughes Aircraft company consisted of total direct labor requirements and production history for the total Maverick missile production. Full-scale production commenced April 1972 and continued without interruption through May 1978 (73 months), resulting in the manufacture of 26,500 units. During the 73 months of production, the government accepted 68 deliveries using the DD Form 250.

This research effort uses the same data as used by the Allen/Farr team in their research except for production rate. Where Allen/Farr used actual production rate, this research uses the DD Form 250 acceptance rate

as a proxy for actual production rate. Because the data reflected significant fluctuation in the acceptance rate, the Maverick program provides an excellent test situation for this comparative research. In the Allen/Farr research, the Maverick data were broken down into several major components: fabrication, assembly, and test. These three components were then incorporated into a total model. This research models only the fabrication component and the total model used in the Allen/Farr effort. Funding limitation precluded incorporating the assembly and test components into this research.

One intriguing aspect of the Maverick data was the manner in which the manufacturer accounted for direct labor hours. Direct labor hours were segmented into two components: Unit Index and Standard Hours. On a continuing basis, Hughes conducted time and motion studies to estimate how many hours it would take to manufacture each missile under "ideal" conditions at a particular point in the production program. This estimate was called Standard Hours, and its evolution over time represented a measure of methods improvement. For each month of production, Hughes computed a Unit Index reflecting the deviation between actual number of direct labor hours required for production and the number of hours that would be required under ideal conditions. Whenever the actual number of

hours required for production achieved the "ideal" standard, the Unit Index was equal to one. Any value of the index greater than one reflected less than ideal performance. The evolution of the index over time represented a measure of labor improvement or learning. To calculate direct labor hours per missile, the Unit Index was multiplied by the Standard Hours. For example, assume the program is in the early stages of production, the Standard Hours are 100 hours per unit and the Unit Index is 2.50 per unit (less than perfect conditions). The two are then multiplied to calculate total hours per missile of 250.

As one might expect, the Unit Index, Standard Hours, and direct labor hours exhibited learning trends to varying degrees. Because of this unique accounting procedure, Allen and Farr were able to assess the effects of the production rate on both the "labor learning" and "methods improvement" aspects of direct labor (2:39). The same advantage holds for this research because of the simplicity of substituting the acceptance rate proxy for actual production rate.

The raw data are transformed into logarithmic form to be used in six different models for this research. The first three models are labeled as follows:

Model One: Total Hours Per Unit,

Model Two: Unit Index for Total Hours Per Unit, and Model Three: Standard Hours for Total Hours Per Unit. The last three models are labeled as follows:

Model	Four:	Fabrication Hours Per Unit,
Model	Five:	Unit Index for Fabrication Hours Per Unit, and
Model	Six:	Standard Hours for Fabrication Hours

Regression analysis is performed on both the reduced and the full forms of the models, and test statistics are calculated. The test statistics are then compared with the critical values required, and the criterion tests are applied to determine if the model is acceptable for testing. If the results for a particular model support its acceptability and the criterion tests fail to reject the model as inappropriate, that model is then tested for its predictive ability. The statistical tests, criterion tests, and their objectives for this research effort are discussed in detail in the following section.

ANALYSIS METHODOLOGY

The hypothesis to be tested in this research is that the predictive ability of Smith's model is not compromised by the substitution of the DD Form 250 acceptance rate for the actual production rate variable.

Testing this hypothesis first requires determining if the model, using the DD Form 250 acceptance data, is acceptable. Then, if the model is found to be acceptable, the predictive ability of the model is compared to the predictive ability of the model using actual production rate data to determine if any compromise exists.

To determine if a model using the DD Form 250 acceptance rate is acceptable requires two steps. The first step examines the statistical significance of the model's regression coefficients by regression analysis of historical production data. This step is composed of two statistical steps. The second step involves the use of two criterion tests to evaluate the appropriateness of the model for this data. The dependent variable of the full model, in log-linear form, will be subjected to regression analysis. The independent variables are the logarithms of cumulative output and the DD Form 250 acceptance rate.

MODEL ACCEPTABILITY TESTING

Statistical Tests

The first statistical test (ST1) examines the relationship between the cumulative output and acceptance rate variables and the direct labor hour variable as shown in the model. The null hypothesis and its alternate are formed as follows:

 $H_0: B_1 \text{ and } B_2 = 0$ $H_A: B_1 \neq 0 \text{ and/or } B_2 \neq 0$

This hypothesis will be tested using the following format:

(1) State the null and alternate hypothesis.

(2) State the alpha level (level of significance).

(3) State the test statistic. The test statistic for statistical test one will be the F-test.

(4) State the Decision Rule. If the F-ratio is greater than F*, reject H_0 , else cannot reject H_0 .

(5) State the Decision based upon the Decision Rule.

Mathematically, F-ratio = MSR/MSE, MSR = SSR/p-1, and

MSE = SSE/n-p where:

- MSR represents the mean of the regression sum of squares in logarithmic form,
- MSE represents the mean of the error (or residual) sum of squares in logarithmic form,
- SSR represents the regression sum of squares in logarithmic form,
- SSE represents the error (or residual) sum of squares in logarithmic form,
- n represents the number of observations, and
- p represents the number of parameters in the model (11:45, 79, 227-228).

The F-ratio compares the explained variance (MSR) to the unexplained variance (MSE), and thus determines the ability of the model to explain the variance of the dependent variable (2:26). The second statistical test (ST2) tests the ability of the DD Form 250 acceptance rate variable, when combined with the cumulative output variable, to explain additional variation in direct labor hours per missile. Statistically, the null and its alternate hypotheses are:

- $H_0: B_2 = 0$
- $H_{\Lambda}: B_2 \neq 0$

This hypothesis will be tested using the following format:

(1) State the null and alternate hypotheses.

(2) State the alpha level (level of significance).

(3) State the test statistic. The test statistic for statistical test two will be the F-test.

(4) State the Decision Rule. If the F-statistic is greater than F*, reject H_0 , else cannot reject H_0 .

(5) State the Decision based upon the Decision Rule.

The value of F* is determined as follows:

$$F^* = \frac{\Delta R^2/g}{(1-R^2)/(n-k-1)}$$

where:

- ΔR^2 represents the increase in explained variations caused by the addition of the logarithm of the acceptance rate variable to the reduced model,
- g represents the number of variables (in this case, one) which cause the increase in \mathbb{R}^2 ,
- n represents the number of observations,

k represents the total number of regressors, and

n-k-l represents the degrees of freedom in the unexplained variation (17:435).

The F* statistic in this test yields a ratio of the increase in explained variance to the remaining unexplained variance which resulted from introducing the acceptance rate variable into the reduced model (2:27).

Criterion Tests

The first criterion test (CT1) for the appropriateness of the model concerns the assumptions about the residuals, or observed errors. The model is considered appropriate for the data if the assumptions about constant variance of residuals, independence of residuals, and normal distribution of residuals cannot be rejected on the basis of appropriate tests (11:240).

The assumption of constant variance of residuals is tested by plotting the residual values against the predicted values of the dependent variable. The assumption is accepted if the plot revealed an even distribution (no discernible pattern) and if most residuals are within one standard error of the estimate (11:239-240).

The Durbin-Watson Test (2:28) was used to check for independence of residuals. The test determined whether or not the autocorrelation parameter ρ was equal to zero. The test alternatives were:

H_O: ρ > 0

 $H_A: \rho = 0 .$

This portion of criterion test one (CT1) will be tested using the following format:

(1) State the null and alternate hypotheses.

(2) State the alpha level (level of significance).

(3) State the test statistic. The test statistic for criterion test one will be the Durbin-Watson statistic.

(4) State the Decision Rule. If D is greater than d_L , conclude H_A ; if D is less than d_U , conclude H_O ; if $d_L \leq D \leq d_U$, test is inconclusive.

(5) State the Decision based upon the Decision Rule.

A statistical package called "STAT II" in the Copper Impact Library at the Air Force Institute of Technology calculated the Durbin-Watson statistic designated as D. Table A-6 in the Neter and Wasserman text contained upper and lower bounds (d_U and d_L) for various sample sizes, levels of significance, and numbers of independent variables. The calculated D statistic was compared to the upper and lower bounds in the table at the 0.05 level of significance. If H_A was concluded, the residuals were considered to be independent (2:29).

The assumption of normal distribution of residuals was tested through the Kilmogorov-Smirnov (KS) test. The

basis of the KS estimation procedure is the cumulative sample function, which is denoted by S(X). S(X) specifies for each value of X the proportion of values less than or equal to X. The KS procedure utilizes a statistic, denoted by D(n), which is based on the differences between the cumulative sample function S(X) and the true cumulative probability function F(X).

D(n) = Max |S(X) - F(X)| .

In other words, D(n) equals the largest absolute deviation of S(X) from F(X) at any value of X. D(n) is shown as a function of n because it depends on the sample size. Surprisingly, however, it does not depend on the specific form of F(X). Hence, the KS procedure may be used for goodness of fit tests for any shape distribution, and will be used in this case to see if the residuals were normally distributed (2:29).

The KS statistic used in this research was calculated by the STAT II package in the Copper Impact Library. If the calculated statistic was below the critical value in the D(n) table, the data were considered normal. Stated in hypothesis form:

 $H_0: KS \ge D(n)_c$

 $H_A: KS < D(n)_c$.

This portion of criterion test one (CT1) will be tested using the following format:

(1) State the null and alternate hypotheses.

(2) State the alpha level (level of significance).

(3) State the test statistic. The test statistic for this portion of CT1 is the KS test.

(4) State the Decision Rule. If KS is less than $D(n)_c$, reject H_0 .

(5) State the Decision based upon the Decision Rule.

The second criterion test (CT2), which also tests the appropriateness of the model, involves the use of the multiple coefficient of determination, known as R^2 . The R^2 value measures the proportion of variation in direct labor hours that is explained by the regression model. R^2 is calculated by subtracting the quotient of SSE/SSTO from one. The error sume of squares, SSE, is the summation of all squared residuals, and is formally defined in statistical test one (ST1). The total sum of squares, SSTO, is calculated by summing the squared differences between each observed value of the mean of the dependent variable (11:77).

In this model, R^2 , as a valid measure of explained variation, is somewhat obscured by the transformation of the model to logarithmic form. R^2 in that form represents the logarithmic value of direct labor hour variation rather than variation in actual hours. Smith, in his research, developed a more meaningful statistic which he

called R^2 (actual) (14:53). R^2 (actual) is calculated in the same way that R^2 is, except that the SSE and SSTO values are calculated after transforming the observed and predicted values of the dependent variables from the logarithmic to actual form. In that way, the variation is represented in actual hours instead of logarithms (2:31).

An appropriate model for the data would explain a high proportion of variation in direct labor, and would consequently yield a high R^2 (actual). Therefore, in this criterion test, an R^2 (actual) value of .75 or higher is selected as the level at which the model could not be rejected as inappropriate (2:31).

If an acceptable model is found after model acceptability testing (ST1, ST2, CT1, and CT2), predictive ability is then tested.

PREDICTIVE ABILITY TESTING

After the full model, with DD Form 250 data incorporated, is accepted as the result of model acceptability testing, its predictive ability is determined. This determination is made by comparing the full model with the reduced model.

To determine if the acceptable full model is a more accurate predictor than the reduced model, the full and reduced regression models are developed with the last 12

data points omitted. Then, using these models, omitted values (which were known but not used in estimating the model coefficients) are predicted. Then, an evaluation of the deviation of the predicted values from the observed values, for both the full and reduced models, is accomplished.

The comparison is made using both a statistical test (ST3) and a criterion test (CT3). The statistical test is used to determine whether the full model is significantly more accurate than the reduced model in predicting the labor hour values omitted in the prediction simulation. Where the full model may be found to be a significantly better predictor based on the statistical test, a criterion test is then applied to establish whether the improved predictive ability of the full model has a practical significance as well.

Statistical Test

The statistical test (ST3) is performed to determine if the average absolute deviation of the full model $(|\overline{D}_{F}|)$ is significantly less than that of the reduced model $(|\overline{D}_{R}|)$. The average absolute deviation for each model is computed by taking the absolute value of the difference between the actual and predicted direct labor hours occurring in each test situation, then separately summing

the absolute deviations for each model in all test situations (2:33).

Statistically, the null and alternate hypotheses are:

$$\begin{split} {}^{\mathrm{H}}_{\mathrm{O}} \colon & |\overline{\mathrm{D}}_{\mathrm{R}}| \leq |\overline{\mathrm{D}}_{\mathrm{F}}| \\ {}^{\mathrm{H}}_{\mathrm{A}} \colon & |\overline{\mathrm{D}}_{\mathrm{R}}| > |\overline{\mathrm{D}}_{\mathrm{F}}| \quad . \end{split}$$

This hypothesis is tested using the following format:

(1) State the null and alternate hypotheses.

(2) State the alpha level (level of significance).

(3) State the test statistic. The test statistic for statistical test three will be the Student's t test.

(4) State the Decision Rule. The Decision Rule for ST3 will be to reject H_0 if t > t_c(0.05), where:

$$t = (|\overline{D}_{R}| - |\overline{D}_{F}|) / \sqrt{(s_{R}^{2}/N) + s_{F}^{2}/N)}$$

(5) State the Decision based upon the Decision Rule.In the above Decision Rule, the variables are defined as follows:

 S_R^2 represents the variance of the distribution of deviations obtained with the reduced model,

- S_F^2 represents the variance of the distribution of deviations obtained with the full model,
- N represents the number of test situations, and
- t represents the critical t value obtained from a table of Student's t critical values (17:208-215).

Criterion Test

Where the improved predictive ability of the full model over the reduced model may be shown to be statistically significant, the model will then be subjected to a test of practical significance. This criterion test (CT3) is necessary because (1) the reduced model, although shown to be a statistically less accurate predictor, could still be sufficiently accurate for practical application, or (2) the full model, although shown to be a statistically better predictor than the reduced model, could still be so inaccurate as to be of no value in practical application. In either instance, the addition of the acceptance rate variable would not be considered worthwhile from a cost/benefit standpoint (2:34).

To perform the criterion test (CT3), the individual deviations computed for the full and reduced models in each test situation under statistical test three (ST3) are converted into a measure of deviation expressed as a percentage of the actual direct labor hours. The use of percentage facilitates later comparison of results between this program and other programs whose values for direct labor hours are relatively large. Two categories are then established for the deviations.

These categories provide a basis for comparison of the predictive ability of the two models. When percentage deviations fall in the range greater than five percent to ten percent or less, the predictive ability is categorized as good. When percentage deviations are five percent or less, the predictive ability is categorized as excellent. The number of test situations in which the percentage deviations fall into each category is then separately summed for the full and reduced models. Totals for each category and model are then subjectively compared and the model with the greater total number of good and excellent predictions is judged to have the better practical predictive ability (2:35).

SUMMARY

Historical production (acceptance) data will be analyzed using least squares multiple linear regression. The research hypothesis will then be tested using the statistical and criterion tests described in this chapter.

The model's acceptability for testing is evaluated using two statistical tests and two criterion tests. If all tests are passed, the full model is then evaluated for predictive ability. The conclusion sought is that the acceptance rate 's a significant factor in determining direct labor hour requirements for missile production.

The predictive ability of the model is evaluated using one statistical test and one criterion test. If both tests are passed, the full model is shown to have better practical predictive ability than the reduced model.

Certain assumptions are necessary for the regression model to be appropriate. The strength and validity of the conclusions drawn from the research hypothesis are dependent on the applicability of these assumptions. Further, the methodology contains certain limitations which must be considered. A summary of the assumptions and limitations follows.

Assumptions

(1) Historical data obtained from the manufacturer were recorded accurately.

(2) Multicollinearity did not impair the short-range predictive ability of the models.

(3) Data measurements and transformations were accurate.

(4) No significant loss of data precision was induced by the logarithmic transformation of the data used to facilitate multiple linear regression.

(5) The error terms had a normal distribution with a mean of zero and constant variance, and they were statistically independent (2:41-44).

Limitations

(1) Subjective analysis was required to assess the validity of the assumptions concerning error terms.

(3) Funding limitation precluded inc prorating the assembly and test components into this research. This research models only the fabrication component and the total model used in the Allen/Farr research.

CHAPTER III

DATA ANALYSIS AND EVALUATION

This chapter presents analysis of the efficacy of using the DD Form 250 Maverick missile acceptance data as a proxy for actual production rate. Utilizing the methodology presented in Chapter II, six regression models were tested for acceptability. The six models differ in the direct labor hour variable (Y_i) as follows:

Model	One	=	(Y _t)	=	total direct labor hours,
Model	Two	=	(Y _{tu})	Ξ	unit index portion of total direct labor hours,
Model	Three	=	(Y _{tsh})	=	standard hours portion of total direct labor hours,
Model	Four	z	(Y ₁)	=	fabrication direct labor hours,
Model	Five	-	(Y _{fu})	=	unit index portion of fabri- cation direct labor hours, and
Model	Six	-	(Y _{fsh})	3	standard hours portion of fabrication direct labor

Following the acceptance testing for these six models, those models found to be acceptable are tested to determine their predictive ability and then are compared with the reduced model.

PRESENTATION OF MODELS AND ACCEPTABILITY TESTS

Model One

Model One is presented below. The raw data and results of each statistical/criterion test are presented in Tables 4, 5, and 6.

Reduced Model:

$$Y_t = B_0 \cdot X_1^{B_1}$$

or in logarithmic form:

$$Log(Y_t) = Log(B_0) + B_1 \cdot Log(X_1)$$

Full Model:

$$\mathbf{Y}_{t} = \mathbf{B}_{0} \cdot \mathbf{X}_{1}^{\mathbf{B}_{1}} \cdot \mathbf{X}_{2}^{\mathbf{B}_{2}}$$

or in logarithmic form:

$$Log(Y_t) = Log(B_0) + B_1 \cdot Log(X_1) + B_2 \cdot Log(X_2)$$

where:

- Y_t = total direct labor hours/equivalent unit/accounting month,
- $X_1 =$ cumulative output plot point (cumulative units at end of accounting month),
- $X_2 = DD$ Form 250 acceptance rate/accounting month.

Model Two

Model Two is presented below. The raw data and results of each statistical/criterion test are presented in Tables 7, 8, and 9. Reduced Model:

$$Y_{tu} = B_0 \cdot X_1^{B_1}$$

or in logarithmic form:

$$Log(Y_{tu}) = Log(B_0) + B_1 \cdot Log(X_1)$$

Full Model:

$$\mathbf{x}_{tu} = \mathbf{B}_{o} \cdot \mathbf{x}_{1}^{\mathbf{B}_{1}} \cdot \mathbf{x}_{2}^{\mathbf{B}_{2}}$$

or in logarithmic form:

$$Log(Y_{tu}) = Log(B_0) + B_1 \cdot Log(X_1) + B_2 \cdot Log(X_2)$$

where:

- Y = unit index portion of total hours/equivalent unit/accounting month,
- X₁ = cumulative output plot point (cumulative units at end of accounting month),
- X₂ = DD Form 250 acceptance rate/accounting month.

Model Three

Model Three is presented below. The raw data and results of each statistical/criterion test are presented in Tables 10, 11, and 12.

Reduced Model:

$$Y_{tsh} = B_o \cdot X_1^{B_1}$$

or in logarithmic form:

$$Log(Y_{tsh}) = Log(B_0) + B_1 \cdot Log(X_1)$$

Full Model:

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$$Y_{tsh} = B_0 \cdot X_1^{B_1} \cdot X_2^{B_2}$$

or in logarithmic form:

 $Log(Y_{tsh}) = Log(B_0) + B_1 \cdot Log(X_1) + B_2 \cdot Log(X_2)$

where:

Y _{tsh} =	standard hours portion o labor hours/equivalent u month,	f total direct nit/accounting
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- X₁ = cumulative output plot point (cumulative units at end of accounting month),
- X₂ = DD Form 250 acceptance rate/accounting month.

Model Four

Model Four is presented below. The raw data and results of each statistical/criterion test are presented in Tables 13, 14, and 15.

Reduced Model:

$$\mathbf{x}_{f} = \mathbf{B}_{o} \cdot \mathbf{x}_{1}^{\mathbf{B}_{1}}$$

or in logarithmic form:

$$Log(Y_f) = Log(B_0) + B_1 + Log(X_1)$$

Full Model:

$$\mathbf{x}_{f} = \mathbf{B}_{o} \cdot \mathbf{x}_{1}^{\mathbf{B}_{1}} \cdot \mathbf{x}_{2}^{\mathbf{B}_{2}}$$

or in logarithmic form:

$$Log(Y_{4}) = Log(B_{0}) + B_{1} \cdot Log(X_{1}) + B_{2} \cdot Log(X_{2})$$

where:

- Y_f = fabrication direct labor hours/equivalent unit/accounting month,
- X₁ = cumulative output plot point (cumulative units at end of accounting month),

 $X_2 = DD$ Form 250 acceptance rate/accounting month.

Model Five

Model Five is presented below. The raw data and results of each statistical/criterion test are presented in Tables 16, 17, and 18.

Reduced Model:

$$\mathbf{x}_{fu} = \mathbf{B}_{o} \cdot \mathbf{x}_{1}^{\mathbf{B}_{1}}$$

or in logarithmic form:

$$Log(Y_{fu}) = Log(B_0) + B_1 \cdot Log(X_1)$$

Full Model:

$$\mathbf{Y}_{\mathbf{fu}} = \mathbf{B}_{\mathbf{o}} \cdot \mathbf{X}_{1}^{\mathbf{B}_{1}} \cdot \mathbf{X}_{2}^{\mathbf{B}_{2}}$$

or in logarithmic form:

$$Log(Y_{f_{11}}) = Log(B_0) + B_1 \cdot Log(X_1) + B_2 \cdot Log(X_2)$$

where:

- Y_{fu} = unit index portion of fabrication direct labor hours/equivalent unit/accounting month,
- X₁ = cumulative output plot point (cumulative units at end of accounting month),
- X_2 = DD Form 250 acceptance rate/accounting month.

Model Six

Model Six is presented below. The raw data and results of each statistical/criterion test are presented in Tables 19, 20, and 21.

Reduced Model:

$$Y_{fsh} \approx B_0 \cdot X_1^{B_1}$$

or in logarithmic form:

$$Log(Y_{fsh}) = Log(B_0) + B_1 \cdot Log(X_1)$$

Full Model:

$$Y_{fsh} = B_0 \cdot X_1^{B_1} \cdot X_2^{B_2}$$

or in logarithmic form:

 $Log(Y_{fsh}) = Log(B_0) \cdot B_1 \cdot Log(X_1) + B_2 \cdot Log(X_2)$

where:

- Y_{fsh} = standard hours for fabrication direct labor hours/equivalent unit/accounting month,
- X₁ = cumulative output plot point (cumulative units at end of accounting month),
- X_2 = DD Form 250 acceptance rate/accounting month.

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MODEL ONE - RAW DATA

(Total Hours Per Unit)

TEST ITEMS	REDUCED MODEL	FULL MODEL
Estimated B	954.16	984.48
Estimated B ₁	-0.24	-0.22
Estimated B ₂		-0.04
Data for ST1		
F Ratio	765.40	409.96
F Critical		3.15
Data for ST2		
F Statistic		5.25
F Critical		4.00
Data for CT1		
KS Statistic		. 26
KS Critical		.16
Durbin-Watson Statistic	c	1.02
Durbin-Watson Critical (d _U /d _L)		1.67/1.55
Data for CT2		
R^2 Log	.921	. 927
R ² Actual	.918	. 898

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MODEL	ONE		ST1	Ł	ST2	RESULTS
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	Statistical Test One Results
(1)	$H_0: B_1 \text{ and } B_2 = 0$
	$H_A: B_1 \neq 0 \text{ and/or } B_2 \neq 0$
(2)	$\alpha = 0.05$
(3)	Test Statistic: F-Test
(4)	Decision Rule: If the F-ratio is greater than F*, reject H ₀ , else cannot reject H ₀ .
(5)	Decision: $F-Ratio = 409.96$ $F^* = 3.15$
	409.96 is greater than 3.15, so reject H_0 .
	Statistical Test Two Results
(1)	$H_0: B_2 = 0$
	H_{A} : $B_{A} \neq 0$
	A Z Z
(2)	$\alpha = 0.05$
(2) (3)	$\alpha = 0.05$ Test Statistic: F-Test
(2) (3) (4)	$ \begin{array}{l} \alpha & = \ 0.05 \\ \hline \alpha & = \ 0.05 \\ \hline \text{Test Statistic: } F\text{-Test} \\ \hline \text{Decision Rule: } If the F Statistic is greater \\ than F*, reject H_0, else \\ cannot reject H_0. \end{array} $
(2) (3) (4) (5)	A 2 $\alpha = 0.05$ Test Statistic: F-Test Decision Rule: If the F Statistic is greater than F*, reject H ₀ , else cannot reject H ₀ . Decision: F Statistic = 5.25 F* = 4.00

MODEL ONE - CT1 & CT2 RESULTS

Criterion Test One Results Test of Constant Variance of Residuals: The assumption of constant variance of residuals cannot be made because of discernible patterns. Test of Independence of Residuals: (1) H_0 : ρ is greater than 0 $H_{A}: \rho = 0$ (2) $\alpha = 0.05$ (3) Test Statistic: Durbin-Watson (4) Decision Rule: If D is greater than d_{I} , conclude H_A ; if D is less than d_U . conclude H_0 ; if $d_L \leq D \leq d_U$, test is inconclusive. 1.02 is less than 1.67, (5) Decision: D = 1.02so conclude H_0 . $d_{T_{1}} = 1.55$ $d_{11} = 1.67$ Test of Normal Distribution of Residuals: (1) H_{O} : KS $\geq D(n)_{c}$ H_A : KS < D(n) (2) $\alpha = 0.05$ (3) Test Statistic: KS If KS is less than $D(n)_c$, (4) Decision Rule: reject H_O. = .26 (5) Decision: KS .26 is greater than .16, $D(n)_{c} = .16$ so cannot reject H_O. Criterion Test Two Results \mathbf{R}^2

R² (Actual) = .898 and is greater than .75. So, model cannot be rejected as inappropriate for this test.

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MODEL TWO - RAW DATA

(Unit Index for Total Hours Per Unit)

TEST ITEMS	REDUCED MODEL	FULL MODEL
Estimated B	45.34	49.29
Estimated B ₁	-0.21	-0.15
Estimated B_2		-0.11
Data for ST1		
F Ratio	360.54	279.32
F Critical		3.15
Data for ST2		
F Statistic		.31.50
F Critical		4.00
Data for CT1		
KS Statistic		. 22
KS Critical		.16
Durbin-Watson Statistic		1.22
Durbin-Watson Critical (d _U /d _L)		1.67/1.55
Data for CT2		
R ² Log	.845	. 896
R ² Actual	.878	.855

	TABLE 8
	MODEL TWO - ST1 & ST2 RESULTS
	Statistical Test One Results
(1)	$H_0: B_1 \text{ and } B_2 = 0$
	$H_A: B_1 \neq 0 \text{ and/or } B_2 \neq 0$
(2)	$\alpha = 0.05$
(3)	Test Statistic: F-Test
(4)	Decision Rule: If the F-ratio is greater than F*, reject H _o , else cannot reject H _o .
(5)	Decision: F-Ratio = 279.32 $F^* = 3.15$ 279.32 is greater than 3.15, so reject H ₀ .
	Statistical Test Two Results
(1)	$H_0: B_2 = 0$ $H_A: B_2 \neq 0$
(2)	$\alpha = 0.05$
(3)	Test Statistic: F-Test
(4)	Decision Rule: If the F Statistic is greater than F*, reject H _O , else cannot reject H _O .
(5)	Decision: F Statistic = 31.50 F* = 4.00
	31.50 is greater than 4.00, so reject H_0 .

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MODEL TWO - CT1 & CT2 RESULTS

Criterion Test One Results	
Test of Constant Variance of Residuals: The assump- tion of constant variance of residuals cannot be made because of discernible patterns.	
Test of Independence of Residuals:	
(1) $H_0: \rho$ is greater than 0	
$\mathbf{n}_{\mathbf{A}} \cdot \mathbf{p} = 0$	
(2) (2)	
(3) Test Statistic: Durbin-Watson	
(4) Decision Rule: If D is greater than d_L , con- clude H_A ; if D is less than d_L	, ,
conclude H_0 ; if $d_L \leq D \leq d_U$, test is inconclusive.	
(5) Decision: = 1.22 1.22 is less than 1.67, $d_L = 1.55$ so conclude H _O .	
$d_{U} = 1.67$	
Test of Normal Distribution of Residuals:	
(1) $H_0: KS \ge D(n)_c$ $H_A: KS < D(n)_c$	
(2) $\alpha = 0.05$	
(3) Test Statistic: KS	
(4) Decision Rule: If KS is less than $D(n)_c$, reject H_0 .	
(5) Decision: KS = .22 .22 is greater than .1 $D(n)_{c} = .16$ so cannot reject H ₀ .	6,
Criterion Test Two Results	-
B^2 (Actual) = osc and the method to T	-

R^a (Actual) = .855 and is greater than .75. So, model cannot be rejected as inappropriate for this test.

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MODEL THREE - RAW DATA

(Standard Hours for Total Hours Per Unit)

TEST ITEMS	REDUCED MODEL	FULL MODEL
Estimated B	86,27	83.00
Estimated B_1	-0.06	-0.09
Estimated B ₂		0.05
Data for ST1		
F Ratio	173.66	174.50
F Critical		3.15
Data for ST2		
F Statistic		49.01
F Critical		4.00
Data for CT1		
KS Statistic		.13
KS Critical		.16
Durbin-Watson Statistic		1.46
Durbin-Watson Critical (d _U /d _L)		1.67/1.55
Data for CT2		
R^2 Log	.725	.843
R ² Actual	.694	.824

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MODEL	THREE	-	ST1	&	ST2	RESULTS
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- · · · · · ·	Statistical Test One Results
(1)	$H_0: B_1 \text{ and } B_2 = 0$
	$H_A: B_1 \neq 0 \text{ and/or } B_2 \neq 0$
(2)	$\alpha = 0.05$
(3)	Test Statistic: F-Test
(4)	Decision Rule: If the F-ratio is greater than F*, reject H _O , else cannot reject H _O .
(5)	Decision: F-Ratio = 174.50 F* = 3.15 174.50 is greater than 3.15, so reject H _O .
•	Statistical Test Two Results
(1)	$H_0: B_2 = 0$
	$H_A: B_2 \neq 0$
(2)	$\alpha = 0.05$
(3)	Test Statistic. F-Test
(4)	Decision Rule: If the F Statistic is greater than F*, reject H _O , else cannot reject H _O .
(4) (5)	Decision Rule: If the F Statistic is greater than F*, reject H _O , else cannot reject H _O . Decision: F Statistic = 49.01 $F^* = 4.00$
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MODEL THREE - CT1 & CT2 RESULTS

	Criterion Test One Results
Test of C tion made	Constant Variance of Residuals: The assump- of constant variance of residuals can be because of indiscernible patterns.
Test of I	Independence of Residuals:
(1)	$H_0: \rho$ is greater than 0 $H_A: \rho = 0$
(2)	$\alpha = 0.05$
(3)	Test Statistic: Durbin-Watson
(4)	Decision Rule: If D is greater than d_L , con- clude H_A ; if D is less than d_U , conclude H_O ; if $d_L \leq D \leq d_U$, test is inconclusive.
(5)	Decision: D = 1.46 1.46 is less than 1.67, $d_{L} = 1.55$ so conclude H _O . $d_{II} = 1.67$
Test of N	Normal Distribution of Residuals:
(1)	$H_{O}: KS \ge D(n)_{C}$ $H_{A}: KS < D(n)_{C}$
(2)	$\alpha = 0.05$
(3)	Test Statistic: KS
(4)	Decision Rule: If KS is less than D(n) _c , reject H _O .
(5)	Decision: KS = .13 .13 is less than .16, $D(n)_{c} = .16$ so reject H _O .
·····	Criterion Test Two Results

 R^2 (Actual) = .824 and is greater than .75. So, model cannot be rejected as inappropriate for this test.

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MODEL FOUR - RAW DATA

(Fabrication Hours Per Unit)

TEST ITEMS	REDUCED MODEL	FULL MODEL
Estimated B	101.55	100.21
Estimated B ₁	-0.105	-0.08
Estimated B ₂		-0.04
Data for ST1		
F Ratio	74.82	41.78
F Critical		3.15
Data for ST2		
F Statistic		4.63
F Critical		4.00
Data for CT1		
KS Statistic		.13
KS Critical		.16
Durbin-Watson Statistic		1.34
Durbin-Watson Critical (d _U /d _L)		1.67/1.55
Data for CT2		
R^2 Log	.531	.562
R ² Actual	.530	. 546

	MODEL FOUR - ST1 & ST2 RESULTS
	Statistical Test One Results
(1)	$H_0: B_1 \text{ and } B_2 = 0$
	$H_A: B_1 \neq 0 \text{ and/or } B_2 \neq 0$
(2)	$\alpha = 0.05$
(3)	Test Statistic: F-Test

(4)	Decision	Rule:	If the F-ratio	is greater than
			F*, reject H _o ,	else cannot
			reject H _o .	

(5) Decision: F-Ratio = 41.78 F* = 3.15

41.78 is greater than 3.15, so reject H_0 .

Statistical Test Two Results

(1) $H_0: B_2 = 0$ $H_A: B_2 \neq 0$ (2) $\alpha = 0.05$ (3) Test Statistic: F-Test (4) Decision Rule: If the F Statistic is greater than F*, reject H_0 , else cannot reject H_0 . (5) Decision: F Statistic = 4.63 F* = 4.00 4.63 is greater than 4.00, so reject H_0 .

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MODEL FOUR - CT1 & CT2 RESULTS

Criterion Test One Results
Test of Constant Variance of Residuals: The assump- tion of constant variance of residuals cannot be made because of discernible patterns.
Test of Independence of Residuals:
(1) $H_{\widehat{\Theta}}$: ρ is greater than 0
H_{A} : $\rho = 0$
(2) $\alpha = 0.05$
(3) Test Statistic: Durbin-Watson
(4) Decision Rule: If D is greater than $d_{L}^{}$, con-
clude H_A ; if D is less than d_{II} ,
conclude H_0 ; if $d_{I_1} \leq D \leq d_{II}$,
test is inconclusive.
(5) Decision: D = 1.34 1.34 is less than 1.67, $d_L = 1.55$ $d_L = 1.67$
Test of Normal Distribution of Residuals:
(1) $H \in KS \setminus D(n)$
$\begin{array}{c} (1) & 1 \\ H \\ H \\ \end{array} \\ \begin{array}{c} KS \\ C \\ H \end{array} \\ \begin{array}{c} KS \\ D(n) \\ \end{array} \end{array}$
(2) $\alpha = 0.05$
(3) Test Statistic: KS
(4) Decision Rule: If KS is less than $D(n)$.
reject H ₀ .
(5) Decision: KS = .13 \cdot .13 is less than .16 D(n) _c = .16 so reject H _O .
Criterion Test Two Results
R^2 (Actual) = .546 and is less than .75. So, model is

rejected as inappropriate for this test.

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MODEL FIVE - RAW DATA

(Unit Index for Fabrication Hours Per Unit)

TEST ITEMS	REDUCED MODEL	FULL MODEL
Estimated B _o	4.29	4.06
Estimated B ₁	-0.08	-0.04
Estimated B_2		-0.07
Data for ST1		
F Ratio	45.02	37.61
F Critical		3.15
Data for ST2		
F Statistic		18.36
F Critical		4.00
Data for CT1		
KS Statistic		.12
KS Critical		.16
Durbin-Watson Statistic		1.81
Durbin-Watson Critical (d _U /d _L)		1.67/1.55
Data for CT2		
R ² Log	. 406	.536
R ² Actual	450	. 508

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MODEL	FIVE	-	ST1	Ł	ST2	RESULTS
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	Statistical Test One Results
(1)	$H_0: B_1 \text{ and } B_2 = 0$
	$H_A: B_1 \neq 0 \text{ and/or } B_2 \neq 0$
(2)	$\alpha = 0.05$
(3)	Test Statistic: F-Test
(4)	Decision Rule: If the F-ratio is greater than F*, reject H _o , else cannot reject H _O .
(5)	Decision: F-Ratio = 37.61 $F^* = 3.15$
	37.61 is greater than 3.15, so reject H_0 .
	Statistical Test Two Results
(1)	$H_0: B_2 = 0$
	$H_A: B_2 \neq 0$
(2)	$\alpha = 0.05$
(3)	Test Statistic: F-Test
(4)	Decision Rule: If the F Statistic is greater than F*, reject H _O , else cannot reject H _O .
(5)	Decision: F Statistic = 18.36 F* = 4.00
	18.36 is greater than 4.00, so reject H_0 .

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MODEL FIVE - CT1 & CT2 RESULTS

Criterion Test One Results Test of Constant Variance of Residuals: The assumption of constant variance of residuals can be made because of indiscernible patterns. Test of Independence of Residuals: (1) $H_0: \rho$ is greater than 0 $H_{A}: \rho = 0$ $\alpha = 0.05$ (2) (3) Test Statistic: Durbin-Watson (4) Decision Rule: If D is greater than $d_{I,}$, conclude H_A ; if D is less than d_{II} , conclude H_0 ; if $d_{L} \leq D \leq d_{U}$, test is inconclusive. (5) Decision: D = 1.811.81 is greater than 1.55, so conclude H_A . $d_{L} = 1.55$ $d_{U} = 1.67$ Test of Normal Distribution of Residuals: (1) $H_0: KS \ge D(n)_c$ H_A : KS < D(n) (2) $\alpha = 0.05$ (3) Test Statistic: KS If KS is less than D(n), (4) Decision Rule: reject H_O. .12 (5) Decision: KS ** .12 is less than .16, $D(n)_{c} = .16$ so reject H_O.

Criterion Test Two Results

 R^2 (Actual) = .508 and is less than .75. So, model is rejected as inappropriate for this test.

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MODEL SIX - RAW DATA

(Standard Hours for Fabrication Hours Per Unit)

TEST ITEMS	REDUCED MODEL	FULL MODEL
Estimated B	25.75	26.76
Estimated B ₁	-0.03	-0.06
Estimated B_2 .		0.05
Data for ST1		
F Ratio	8.99	13.41
F Critical		3.15
Data for ST2		
F Statistic	'	15.82
F Critical		4.00
Data for CT1		
KS Statistic		.15
KS Critical		.16
Durbin-Watson Statistic		1.97
Durbin-Watson Critical (d _U /d _L)		1.67/1.55
Data for CT2		
R^2 Log	.120	. 292
R ² Actual	.111	. 268

TABLE	20
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MODEL SIX - ST1 & ST2 RESULTS Statistical Test One Results (1) $H_0: B_1 \text{ and } B_2 = 0$ $H_A: B_1 \neq 0 \text{ and/or } B^2 \neq 0$ (2) $\alpha = 0.05$ (3) Test Statistic: F-Test (4) Decision Rule: If the F-ratio is greater than F*, reject H₀, else cannot reject Ho. (5) Decision: F-Ratio = 13.41 $F^* =$ 3.15 13.41 is greater than 3.15, so reject H_{0} . Statistical Test Two Results (1) $H_0: B_2 = 0$ $H_A: B_2 \neq 0$ (2) $\alpha = 0.05$ (3) Test Statistic: F-Test (4) Decision Rule: If the F Statistic is greater than F*, reject H₀, else cannot reject Ho. (5) Decision: F Statistic = 15.82 F* = 4.00 15.82 is greater than 4.00, so reject H_{O} .

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MODEL SIX - CT1 & CT2 RESULTS

Criterion Test One Results
Test of Constant Variance of Residuals: The assump- tion of constant variance of residuals can be made because of indiscernible patterns.
Test of Independence of Residuals:
(1) H_0 : ρ is greater than 0 H_A : $\rho = 0$
(2) $\alpha = 0.05$
(3) Test Statistic: Durbin-Watson
(4) Decision Rule: If D is greater than d_L , con- clude H_A ; if D is less than d_U , conclude H_O ; if $d_L \leq D \leq d_U$, test is inconclusive.
(5) Decision: $D = 1.97$ 1.97 is greater than 1.55, $d_L = 1.55$ so conclude H_A . $d_U = 1.67$
Test of Normal Distribution of Residuals:
(1) $H_0: KS \ge D(n)_c$ $H_A: KS < D(n)_c$
(2) $\alpha = 0.05$
(3) Test Statistic: KS
<pre>(4) Decision Rule: If KS is less than D(n) reject H_O.</pre>
(5) Decision: KS = .15 .15 is less than .16, $D(n)_c = .16$ so reject H _O .
Criterion Test Two Results

 R^2 (Actual) = .268 and is less than .75. So, model is rejected as inappropriate for this test.

SUMMARY OF MODEL ACCEPTABILITY TEST RESULTS

Each of the six models described earlier was subjected to two statistical tests and two criterion tests to evaluate their overall acceptability as suitable models for further predictive ability testing. Below is a concise summary of each model's score (pass/fail) for each of the statistical and criterion tests presented in the previous section. It is important to remember that a model must pass all four of these tests in order to be found acceptable for further predictive ability testing.

Model One

<u>Statistical Test One (ST1).</u> Passed. The F-ratio is greater than F Critical and thus confirms the ability of the model to explain the variance of the dependent variable.

<u>Statistical Test Two (ST2).</u> Passed. The F Statistic is greater than F Critical. Thus, the model adequately explains the additional variation in direct labor hours per missile when the DD Form 250 data are added to the reduced model.

Criterion Test One (CT1). Overall failure.

a. <u>Test of constant variance of residuals</u>. Failed. Could not assume constant variance of residuals because of discernible patterns. b. Test of independence of residuals. Failed. The calculated Durbin-Watson Statistic was less than the upper limit of the table value. Thus, H_0 was concluded which indicates the residuals are dependent.

c. <u>Test of normal distribution of residuals</u>. Failed. The calculated KS Statistic was greater than the critical value listed in the table. Thus, the data were not considered to be normally distributed.

<u>Criterion Test Two (CT2).</u> Passed. The R^2 (Actual) was greater than .75. Thus, the model explains the variation in direct labor hours during the regression analysis.

In summary, Model One passed ST1, ST2, and CT2. It failed all tests contained in CT1 and is, therefore, not acceptable for further testing.

Model Two

<u>Statistical Test One (ST1).</u> Passed. The F-ratio is greater than F critical and thus determines the ability of the model to explain the variance of the dependent variable.

<u>Statistical Test Two (ST2).</u> Passed. The F Statistic is greater than F Critical. Thus, the model adequately explains the additional variation in direct labor hours per missile when the DD Form 250 data are added to the reduced model.

Criterion Test One (CT1). Overall failure.

a. <u>Test of constant variance of residuals</u>. Failed. Could not assume constant variance of residuals because of discernible patterns.

b. <u>Test of independence of residuals</u>. Failed. The calculated Durbin-Watson Statistic was less than the upper limit of the table value. Thus, H_0 was concluded which indicates the residuals are dependent.

c. <u>Test of normal distribution of residuals</u>. Failed. The calculated KS Statistic was greater than the critical value listed in the table. Thus, the data was not considered to be normally distributed.

<u>Criterion Test Two (CT2).</u> Passed. The R^2 (Actual) was greater than .75. Thus, the model explains the variation in direct labor hours during the regression analysis.

In summary, Model Two reacted identically to Model One. Model Two passed ST1, ST2, and CT2. It failed all tests contained in CT1 and is, therefore, not acceptable for further testing.

Model Three

<u>Statistical Test One (ST1).</u> Passed. The F-ratio is greater than F Critical and thus determines the ability of the model to explain the variance of the dependent variable.

Statistical Test Two (ST2). Passed. The F Statistic is greater than F Critical. Thus, the model adequately explains the additional variation in direct labor hours per missile when the DD Form 250 data is added to the reduced model.

Criterion Test One (CT1). Overall failure.

a. <u>Test of constant variance of residuals</u>. Passed. Constant variance of residuals can be assumed because of indiscernible patterns.

b. <u>Test of independence of residuals</u>. Failed. The calculated Durbin-Watson Statistic was less than the upper limit of the table value. Thus, H_0 was concluded which indicates the residuals are dependent.

c. <u>Test of normal distribution of residuals</u>. Passed. The calculated KS Statistic was less than the critical value listed in the table. Thus, the data is considered to be normally distributed.

<u>Criterion Test Two (CT2).</u> Passed. The R^2 (Actual) was greater than .75. Thus, the model explains the variation in direct labor hours during the regression analysis.

In summary, Model Three came very close to passing all four tests. Model Three passed all tests except the Test of Independence of Residuals in CT1. This failure was marginal but was enough to deem Model Three unacceptable for further testing.

Model Four

<u>Statistical Test One (ST1).</u> Passed. The F-ratio is greater than F Critical and thus determines the ability of the model to explain the variance of the dependent variable.

Statistical Test Two (ST2). Passed. The F Statistic is greater than F Critical. Thus, the model adequately explains the additional variation in direct labor hours per missile when the DD Form 250 data are added to the reduced model.

Criterion Test One (CT1). Overall failure.

a. <u>Test of constant variance of residuals</u>. Failed. Could not assume constant variance of residuals because of discernible patterns.

b. <u>Test of independence of residuals</u>. Failed. The calculated Durbin-Watson Statistic was less than the upper limit of the table value. Thus, H_O was concluded which indicates the residuals are dependent.

c. <u>Test of normal distribution of residuals</u>. Passed. The calculated KS Statistic was less than the critical value listed in the table. Thus, the data are considered to be normally distributed.

<u>Criterion Test Two (CT2).</u> Failed. The R^2 (Actual) was less than .75. Thus, the model does not explain the variation in direct labor hours during the regression

analysis.

In summary, Model Four passed ST1, ST2 and failed CT1 and CT2. Therefore, Model Four is not acceptable for further testing.

Model Five

<u>Statistical Test One (ST1).</u> Passed. The F-ratio is greater than F Critical and thus determines the ability of the model to explain the variance of the dependent variable.

Statistical Test Two (ST2). Passed. The F Statistic is greater than F Critical. Thus, the model adequately explains the additional variation in direct labor hours per missile when the DD Form 250 data are added to the reduced model.

Criterion Test One (CT1). Overall pass.

a. <u>Test of constant variance of residuals</u>. Passed. Constant variance of residuals can be assumed because of indiscernible patterns.

b. <u>Test of independence of residuals</u>. Passed. The calculated Durbin-Watson Statistic is greater than the lower limit of the table value. Thus, H_A was concluded which indicates the residuals are independent.

c. <u>Test of normal distribution of residuals</u>. Passed. The calculated KS Statistic was less than the critical value listed in the table. Thus, the data were considered to be normally distributed.

<u>Criterion Test Two (CT2).</u> Failed. The R^2 (Actual) is less than .75. Thus, the model does not explain the variation in direct labor hours during the regression analysis.

In summary, Model Five came very close to being acceptable for further testing. All tests were passed except for CT2. Thus, the model is not acceptable for further testing.

Model Six

<u>Statistical Test One (ST1).</u> Passed. The F-ratio is greater than F Critical and thus determines the ability of the model to explain the variance of the dependent variable.

Statistical Test Two (ST2). Passed. The F Statistic is greater than F Critical. Thus, the model adequately explains the additional variation in direct labor hours per missile when the DD Form 250 data are added to the reduced model.

Criterion Test One (CT1). Overall pass.

a. <u>Test of constant variance of residuals</u>. Passed. Constant variance of residuals can be assumed because of indiscernible patterns.

b. <u>Test of independence of residuals</u>. Passed. The calculated Durbin-Watson Statistic is greater than the

lower limit of the table value. Thus, H_A was concluded which indicates the residuals are independent.

c. <u>Test of normal distribution of residuals</u>. Passed. The calculated KS Statistic was less than the critical value listed in the table. Thus, the data were considered to be normally distributed.

<u>Criterion Test Two (CT2).</u> Failed. The R^2 (Actual) is less than .75. Thus, the model does not explain the variation in direct labor hours during the regression analysis.

In summary, Model Six is identical to Model Five. All tests were passed except for CT2 and the model is not acceptable for further testing.

For ease of comparison, Table 22 further condenses the results of the acceptability testing.

SUMMARY OF RESEARCH HYPOTHESIS ANALYSIS

The research hypothesis stated that the predictive ability of Smith's model is not compromised by the substitution of the DD Form 250 acceptance rate for the actual production rate variable.

In the Allen/Farr research effort, it was concluded that the addition of the production rate variable explained a significant amount of variation in direct labor hours. Additionally, Allen/Farr concluded that the addition of the production rate variable (full model) further enhanced the basic model's (reduced model's)

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SUMMARY OF MODEL ACCEPTABILITY TEST RESULTS

MODEL NUMBER	TEST CATEGORY							
	ST1	ST2	CT1	CT2				
1	Pass	Pass	Fail	Pass				
2	Pass	Pass	Fail	Pass				
3	Pass	Pass	Fail	Pass				
4	Pass	Pass	Fail	Fail				
5	Pass	Pass	Pass	Fail				
6	Pass	Pass	Pass	Fail				

predictive ability.

This research effort substituted the DD Form 250 acceptance rate for the production rate variable in the Allen/Farr data and concluded very definite results. Not one of the six models tested with this proxy were found acceptable for further predictive ability testing. Because Allen/Farr experienced satisfactory results with their models, it can only be concluded that acceptance rate in no way correlates with actual production rate for the Maverick missile data and is not a reliable proxy for actual production rate data.

Both of the statistical tests (ST1 and ST2) indicated full support for the research hypothesis in all six cases. The criterion tests (CT1 and CT2), however, produced mixed results.

Referring to Table 22, it is interesting to note that whenever Models One, Two, or Three failed CT1, these same models passed CT2. Model Four failed both CT1 and CT2. Equally interesting is that Models Five and Six passed CT1 but failed CT2. These comparisons, together with all models passing ST1 and ST2, comprise the only noticeable patterns in the test results.

The results of testing for Statistical Test One (ST1) in every model demonstrated that the explanatory power added by the acceptance rate data was statistically significant at the 0.05 level of significance. Notwithstanding these excellent results, all of the models either failed the KS test for normality of residuals, the Durbin-Watson tes⁺ for independence of residuals, the constant variance test, or a combination of these tests.

In summary, the results did not support the research hypothesis for the Maverick data used by Allen/Farr. In fact, the models were not even acceptable for further predictive ability testing. Chapter IV will contain the summary, conclusions, and recommendations for these research results.

CHAPTER IV

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The years following World War II have presented an era of increasing complexity in DOD weapon systems acquisitions. Air Force managers attempting to plan the acquisition, operation, and maintenance of major weapon systems face an increasing array of obstacles in the form of inflation, spiraling cost of energy, and international political instability. While the task has become more difficult, the need for more accurate cost estimating has become more obvious.

Direct labor is one of the most significant cost elements in a major system acquisition and experience has shown that direct labor costs are most often estimated using learning curve analysis.

SUMMARY

Literature Review

Learning curve models were in use as early as the 1920s and even more interest was generated as a result of the aerospace industry's experience during World War II. Over the years, numerous variations of the basic learning curve model have been investigated. Since the DOD is constantly faced with budgetary and political controls that

cause program accelerations and decelerations, the variation that has the most promise for DOD application is the model that considers the effect of production rate variations.

It is possible, however, that this production rate variable is not always accessible or even available to the DOD researcher interested in projecting the costs of a future DOD major weapons system. When these data are not available, a proxy must be developed as a substitute for the production rate variable. This research effort has investigated the use of acceptance rate as a reliable proxy for the production rate variable in the attempt to predict direct labor costs for the acquisition of a major weapon system.

Most of the research on the effect of production rate changes concluded that production rate is a significant determinant of direct labor costs. Smith developed a learning curve model that included a production rate variable, tested the model on airframe production programs and concluded that the model yielded promising results. Smith's model has been applied to other airframe programs, avionics, and engines, and now has been extended to air-launched missiles in the form of the acceptance rate proxy.

The Model

The production rate model, which Smith called the full model, is presented as follows:

$$Y = B_0 \cdot X_1^{B_1} \cdot X_2^{B_2} \cdot 10^e$$

where the variables are described as follows:

- Y represents direct labor hours,
- X₁ represents cumulative output,
- X_2 represets the production rate (acceptance rate in this research),
- e represents the variation which remains unexplained by the variables in the model, and

 B_0 , B_1 , and B_2 are regression coefficients.

To facilitate regression analysis, the model is linearized using logarithms as follows:

 $\operatorname{Log} Y = \operatorname{Log} B_0 + B_1 \operatorname{Log} X_1 + B_2 \operatorname{Log} X_2 + e \quad .$

The reduced model is identical to the full model except that the reduced model does not include the production rate variable (2:98).

Research Objective

As stated in Chapter I, the objective of this research was to determine if the DD Form 250 acceptance rate can be substituted for the actual production rate variable contained in Smith's model without compromising the predictive ability of that model.

Methodology

Linear regression analysis of the logarithmic forms of the full and reduced models was employed to achieve the research objective. Data were obtained from the Maverick missile production program and the treatment of these data is described in Chapter II. Testing of the research hypothesis first required determining if the model, using the DD Form 250 acceptance rate data, is acceptable. Then, if the model had been found to be acceptable, the predictive ability of the model would have been compared to the predictive ability of the model using actual production rate data to determine if any compromise exists.

То determine if a model using the DD Form 250 acceptance data is acceptable required two steps. The first step examined the statistical significance of the model's regression coefficients by regression analysis of historical production data. This step was composed of two statistical steps. The second step involved the use of two criterion tests to evaluate the appropriateness of the model for this data. The dependent variable of the full model, in log-linear form, was subjected to regression analysis. The independent variables were the logarithms of cumulative output and the DD Form 250 acceptance rate.

After the full model, with the DD Form 250 rate incorporated, is accepted as the result of model

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acceptability testing, its predictive ability can be determined. This determination is made by comparing the full model with the reduced model.

To determine if the acceptable full model is a more accurate predictor than the reduced model, the full and reduced regression models were developed with the last 12 data points omitted. Then, using these models, omitted values would be predicted. Then, an evaluation of the deviation of the predicted values from the observed values, for both the full and reduced models, would have been accomplished.

Had the models been found to be acceptable for further predictive ability testing, the comparison would have been made using both a statistical test and a criterion test. The statistical test is used to determine whether the full model is significantly more accurate than the reduced model in predicting the labor hour values omitted in the prediction simulation. Where the full model is found to be a significantly better predictor based on the statistical test, a criterion test is then applied to establish whether the improved predictive ability of the full model has a practical significance as well.

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CONCLUSIONS

This research provides three primary conclusions. as substituted by the production rate, First, the DD Form 250 acceptance rate, failed to explain 8 significant amount of variation in direct labor hours in the six models examined. Of the six models, none produced acceptable results using the acceptance rate proxy. There was no evident support to conclude that the DD Form 250 acceptance rate variable should be considered as a reliable proxy for actual production rate when evaluating missile production programs.

Second, the results of the predictive ability comparisons were not able to be tested because the model acceptability tests were failed in all six cases. Thus, the DD Form 250 acceptance data, as a proxy, proved to be unreliable as a substitute for actual production data in the prediction of direct labor costs.

Third, as a result of hypotheses testing, it is concluded that Smith's model has no potential for missile production programs when using the DD Form 250 acceptance rate as a proxy for actual production rate. This conclusion is based solely on this research and in no way infers that other proxies, such as delivery rate data, should not be investigated.

RECOMMENDATIONS

This type of learning curve analysis has potential application anywhere that learning curve theory applies and should be used widely within DOD to test the effects of any moderating variable on the cost of a major weapon system acquisition.

A related recommendation is that the research applied in this effort be conducted on delivery rate as well as acceptance rate for other production programs within the DOD. The ease of obtaining these data, compared with the difficulty of obtaining actual production data in some cases, makes the use of proxies an attractive alternative for DOD researchers interested in predicting the direct labor costs of major acquisition.

Finally, it is important to reiterate the Allen/Farr recommendation that a checklist guide to the practical use of Smith's model be developed. Such a guide would encourage the use of the model by those who are uneasy with statistics and the seeming complexity of the model (2:103).

APPENDIX

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THE COMPUTER PROGRAM PRODRATE

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The revised version of PRODRATE developed for this research significantly reduced user costs and increased program usability. PRODRATE users can now perform essential residual analysis with the additional PRODRATE statistics and the statistical packages already incorporated in the basic computer program. In addition, several options are now available to drastically decrease run-time and increase the usability of the prediction routines.

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This section lists the computer program PRODRATE in its entirety. The original program was developed by Colonel Larry L. Smith, and later modified by Captain David Y. Stevens, Captain Scott C. Allen, and Captain Charles M. Farr. The version listed incorporates the original program and all modifications. The actual program used during this research is the program presented in this section. 1160 1260 PPPPP 22259 00000 555 RRSRR AAAAA IITII EEEEE 1350 2 . 9 £ 8 ß 0 8 8 8 R A A 1 ş 1400 FPPPP D - D REFOR ALAAA 62366 - 3 0 1 EEE 1560 2 ĥ 0 ٥ 0 0 R R A 1 . E 1682 R 00000 505 P 2 8 2 ۵ t CEEEE 1780 1960 278C THE CURULATIVE PRODUCTION AND PRODUCTION RATE COST RODEL 21FC 228C THE ORIGINAL PROGRAMER IS LT COL LARRY L. SMITH CAFIT/LSCH AVI 785-5896] - JAN 1978 ZGEC LATER NODIFIED BY CAPT DAVID T. STEVENS (ESS/PKC AVA 478-3462) - JUNE 1979 2310 THIS RODIFIED VERSION WAS PROCEAMMED BY CAPTS SCOTT ALLEN. TOM SAKDMAN, AND 232C MIKE FARR LASD/PM, AFIT LS, AND ASD/PM, RESPECTIVELY) -JUNE 1988 25# 5 FORMAT(1H1,//,16#("+"),//,11,4#1,"PRODRATE INSTRUCTIONS",//,11,14#("+"),//, 2631 THIS PROCRAM IS DESIGNED TO EVALUATE THE VARIATION IN DIRECT LABOR REQUIREMENTS AS A " . / . " FUNCTION OF CUNULATIVE PRODUCTION AND PRODUCTION RATE. IN ADDITION. THE AMPLIST MAT "./. 2761 * COMPARE THE RESULTS OSTAINED FROM THE STANDARD LEARNING CURVE WITH THE RESULTS OBTAINED "./. 2821 * FROM THE CUMULATIVE PRODUCTION AND PRODUCTION RATE MODEL. THE COST MODELS USED IN THIS " / , 2961 " PROGRAM ARE:",//, 3631 1. REDUCED MODEL ISTANDARD LEARNING CURVE MODEL1",//, 31ft 3761 T = 66 + (X1 ++ 61) + (16 ++ E)";//; 33?L 2. FULL KODEL [CUMULATIVE PRODUCTION AND PRODUCTION RATE HODEL]",//, 3462 T = B# + (X1 ++ B1) + (X2 ++ B2) + (19 ++ E)",//, 3561 WHERE: T IS THE DIRECT LABOR REQUIREMENTS"./. 3481 11 IS THE CUMULATIVE PRODUCTION PLOT POINT", /, 3761 12 IS THE PRODUCTION RATE PROIT(E.C. EQUIVALENT UNITS PER KONTH)" // 3851 E REPRESENTS THE EAROR TERM" . / . 3982 60. 21. AND 32 ARE PARAMETERS DETERMINED BY RECRESSION .//. DATA ARE INPUT BY READING FROM ANY PROPERLY FORMATTED DATA FILE. YOUR DATA FILE SHOULD "./. 68.32 " BE SAVED TO ANY PERMINENT FILEMANE. YOU WILL BE ASK TO IMPUT THE MARE OF YOUR DATA FILE ",/, 4126 " AT THE APPROPRIATE STEP IN THE PROCRAM. THE NAME OF YOUR DATA FILE CAN NOT EICEED 8 ". / . (281 4344 " CHARACTERS. THE FIRST LINE OF THE DATA FILE MUST CONTAIN A LINE NUMBER AND THE MIMBER OF ". /. " CASES TO BE READ. THE DATA IS THEM ENTERED ONE CASE PER LINE IN THE FOLLOWING ORDER: "/ 1914 (See . LINE NUMBER, OBSERVED DIRECT LABOR REQUIREMENT (T), CUMULATIVE PRODUCTION PLOT POINT (11),",/, " AND PRODUCTION RATE PROIT (12). THE PROCEMEN USES A FREE FIELD READ FORMATI THEREFORE.". /. 4686 * EACH VARIABLE MUST DE SEPARATED BY AT LEAST DWE SPACE (OR OTHER CELIMITER) BUT NO OTHER 1/1 4786 4892 . SPECIAL FORMAT IS REQUIRED. AN EXAMPLE OF A DATA FILE WITH 5 CASES IS PRESENTED DELON:",// 1961 186 5-11 5781 . 161 155 9.5 9.5"11 5164 182 15 21.5"./. 34 52#6 163 55 25"1/1 34 5341 184 75 \$2 27"1/1 5446 185 71 113 31",//, " OSE ADVANTACE OF THIS PROCRAM IS THAT THE RESULTS OBTAINED WILL BE IN THE SAME UNITS AND 5541 SARE . FORM AS THE INPUT BATA. FOR ETAMPLE, IF TOU ARE NORMING IN DIRECT LABOR HOURS PER NONTH" . / . STAL " AND EQUIVALENT UKITS, THE RESULTS WILL BE IN TERMS OF THESE UNITS. ALSO, IF 100 MISH TO USE", /. SEAS . A CUMULATIVE AVERAGE APPROACH, ALL TOU KEED DO IS ACCRECATE THE DATA BASE IN THAT MANNER.", //, 5981 THE PROCRAM RECTHS BY TRANSFORMING THE IMPUT DATA TO COMMON LOCARITIONS. LOC LINEAR", / .

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4725 * RECRESSION IS THEN PERFORMED AS FOLLOWS: Y RECRESSED ON II+ T RECRESSED ON IZ+ 6407+/+ 4145 * FINALLI I RECRESSED ON POTH II AND IZ. OBSERVED DIRECT LARCE REQUIREMENTS, PREDICTED"./. 4282 * BIRECT LAFOR RECUIREMENTS, AND RESIDUALS ARE FRINTED IN ORICINAL IUNTREMSFORMEDI FORM FOR"// 4304 . EACH RECRESSION SITUATION. IN ADDITION, SUMMART STATISTICS ARE PRINTED FOR EACH MODEL. THE 444 . SUMMARY STATISTICS INCLUDE THE COEFFICIENTS OF DETERMINATION & SOUGHED LOD AND & SQUARED "./. 4302 . ACTUAL. THE & SQUARED LCG REPRESENTS THE COUDNESS OF FIT OF THE HODEL TO THE TRANSFORMED" // 6661 - BATA (LOC FORM). THE & SQUARED ACTUAL, ON THE OTHER HAND, IS CORPUTED USING THE 6702 . WITRANSFORMED RESIDUALS, AND IS REPRESENTATIVE OF HOW WELL THE MODEL FITS THE UNTRANSFORMED" // 4592 " DATA. THE DURBIN-FAISON STATISTIC IS CALCULATED FOR ASSESSMENT OF AUTOCORRELATION"// 4814 " OF THE RESIDUALS.") 498 & FORMAT(181,12+//+ SEVERAL OPTIONS ARE AVAILABLE WITHIN THIS PROGRAM AND CAN BE SELECTED BY APPROPRIATE" . / . 7641 * " ANSWERS TO THE FOLLOWING QUESTIONS:",//, 71£\$ 1. DO TOU WANT TO CHECK DATA AS IT IS READ FROM FILE AND CONVERTED TO" // 7281 LOCARITHES?",//, 7361 748L TES - WILL CAUSE THE PRINTING OF A LISTING OF THE RATIONAL INPUT DATA AND THE !!! ASSOCIATED LOGARITHMIC VALUES.",//, 7544 KO - SUPPRESSES THIS OPTION.".//. 76FL 2. COMPLETE PRINTOUT?",//, 7611 TES - WILL CAUSE OUTPUT TO BE PRINTED IN FULL FORMAT AS DESCRIBED ABOVE. " / , 7624 ND - WILL DELETE THE LISTING OF OBSERVED, PREDICTED, AND RESIDUAL VALUES", / . 7134 7648 BETWEEN TABLES OF SUMMARY STATISTICS. IT WILL ALSO DELETE LISTING OF 7658 INDIVIDUAL NATRICES FOR THE SHORTHANCE PREDICTIVE ABILITI OPTICNILE. ONLY THE SURVARY TABLE WILL BE LISTED.".//. 7666 7782 3. BO TOU WANT A COMPARISON OF THE SHORTRANCE PREDICTIVE ABILITY OF THE TWO HODELS?"/// TES - WILL CAUSE THE FREDICTIVE ABILITY TEST OPTION TO BE ACTIVATED AND THE USER WILL". J. 7582 7961 BE TOLD: "ENTER PREDICTION RANCE (CRSE NUMBERS FOR FIRST AND LAST CASES1.""./. THE USER SHOULD ENTER THE NUMBER OF THE FIRST CASE TO BE PREDICTED FOLLOWED",/, 7912 7921 IT THE LAST CASE TO BE PREDICTED, SEPARATED BY A COMMA. THE CASE NUMBERS", /, MUST BE INTECER VALUES CREATER THAN OR EQUAL TO 2. THE PREDICTIVE . /. 2522 ABILITY TEST SINULATES FUTURE PREDICTIONS BY PERFORMING A STEPHISE TRUCATION OF 1/1 81**#** THE RISTORICAL DATA. FOR THIS REASON, AN UPPER LIMITATION ON THE NURBER OF 1/1 2751 CASES TRUNCATED WOULD DE: (ITOTAL MUMBER OF CASES IN DATA FILE) / 2) - 2",/, R381 FOR ELANPLE, IF TOUR DATA FILE CONTAINS SO CASES, TOUR UPPER LINIT HOULD BE", /, Et at 23 CASES. THIS, OF COURSE, REPRESENTS ONLY THE HALINUM MUNDER OF CASES THAT" // 2582 COULD BE TRUNCATED. IN PRACTICE TOU NAY WANT TO TRUNCATE ONLY A SHALL NUMBER OF 1682 CASES. THUS, IF YOUR DATA IS COLLECTED IN NONTHLY INTERVALS, YOU CAN LOCK AT" // 2765 THE PREDICTIVE ABILITY OF THE FULL AND REDUCED HODELS FOR AN 18 NONTH THE SPAN BY" // 2252 SPECIFYING AN IN CASE RANGE. IF YOUR DATA IS COLLECTED IN MULATERS, YOU CAN LOOK", /, 2951 AT THE PREDICTIVE ABILITY OF BOTH RODELS FOR AN 18 NOWTH TIME SPAN BY SPECIFTING", / i 9442 7252 "6", AFTER ALL PREDICTIVE ABILITY TEST SITUATIONS ARE PRINTED: THE PROGRAM",/, PRINTS A SUGMARY OF THE TEST RESULTS. ".//. \$241 - SUPPRESSES THIS OPTION."+//+ 1366 20 4. DO YOU WANT PROJECTION AND SERSITIVITY MATRIX?",//, 9492 TES - HILL CAUSE PRINTING OF PROJECTION AND SEMSITIVITY MATRIX. THIS NATRIX PRESENTS"./. 158L PROJECTED DIRECT LAROR REQUIREMENTS FOR SELECTED PAIRS OF CUMULATIVE PRODUCTION" // 1182 PLOT POINTS AND PRODUCTION NATES. THE PROJECTION INTERVAL FOR THE CUMULATIVE". / . 97#L PRODUCTION PLOT POINT IS 12 OF THE LAST DESERVED VALUE. THE PROJECTION VALUES". /. 1245 FOR PRODUCTION RATE ARE 74, 85, 98, 189, 118, 128, 138, 148, AND 150 PERCENT OF" // 1111 THE LAST OPSERVED VALUE OF PRODUCTION RATE.",//, 18282 NO -SUPPRESSES THIS OPTION.",//, 10192 " +++SPECIAL NOTE+++ THE PREDICTED DIRECT LABOR REQUIREMENTS AND RESIDUALS FOR EACH MODEL*//. 16116

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ARE STORED IN SEPARATE FILES. THE VALUES FOR THE STANDARD LEARNING CUPVE MODEL APE", /.
16126 *
11136 *
         STURED IN A FILE CALLED 'STULEARN'S THE VALUES FOR THE PRODUCTION RATE VARIABLE ALONE". /.
11144 .
         ROBEL IN THE FILE "REDHOURS"; AND THE VALUES FOR THE CONLINED CUR. PRODUCTION AND" . / .
17156 *
         FRODUCTION RATE MODEL IN THE FILE "FULLMOUL". USERS NAT ACCESS THESE FILES FOR ". /.
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         RESIDUAL AKALTSIS BY OTHER COPPER IMPACT STATISTICAL PROGRAMS. IF DESIRED."
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        BIRENSION PLOT(154), RATE(154), HRS(154), T(154), T(154), Z2(154), LK(154),
પ્રાર્થકા
        KENPLOT (154) . PRORATE (15) . FHRS (156.15) . ADEVR (199) . ADEVF (1991) . RESID (208)
1115
         NATA SUCHARS, SUMII, SUMIZ, SUMI, SSII, SSIZ, SUMIII, SUMIZI, SATIIZ,
         SSE. SSE1. SSE2. SSEL. SSEL1. SSEL2. SST0. SST01. SST02. SST0L1. SST0L1. SST0L2/21.1/
11268
11460
        PART I - BECIN PROCRAM, INSTRUCTIONS, DATA INPUT, DATA TRANSFORMATION, AND OPTION SELECTIONS.
11520
 11660
 1127 PRINT 1195
                                     THE CURRATIVE PRODUCTION AND PRODUCTION RATE COST NODEL")
 1192 1195 FORMAT (11"
 121ØC
       INSTRUCTIONS OPTION SELECTION
 1222 OPTION NOWARN
 1237 OPEN (FILE= 'LOCFILE', UNIT=4, ACCESS= 'LINENO', STATUS= 'UNKNOWN')
 124# OPER(FILE='STCCURVE')
 125# OPER(FILE='REDCURVE')
 1264 - OPEN (FILE= 'FULCURVE')
 1276 OPEN (FILE="STDLEARN")
 1288 OPER(FILE='REGNOURS')
 1298 OPER(FILE='FULLIDOL')
 13## CLOSE (FILE .'STOCURVE')
 131# CLOSE (FILE='REDCURVE')
 132# CLOSE (FILE + 'FULCURVE')
          PRINT 18
 1345
       IF FORMAT (1HJ"BO TON MANT LUSTBUCTIONS")
 1354
 1368 188 IMPUT: ANSWER(1)
  1376
          IF (ANSKER(1).EQ. "NO") GO TO 182
          IF (ANSWER(1).EQ."TES") CO TO 101
  1388
          PRINT," MISHER TES OR NO ONLT PLEASE"
  1311
          PRINT,- -
  1464
  1418
          CQ TO 168
  1428 181 PRINT 5
  1438 PRINT 6
  1446 182 PRINT, "COMPLETE PRINTONT"
  1458 INPUT MIS(3)
  1466 1F (ANS (3) .EQ. "KO".OR.ANS (3) .EQ. "YES") 50 TO 672
  1478 PRINT, "ANSHER TES OR NO ONLT PLEASE"
```

1483 CO TO 102

```
INPUT THE GATA AND TRANSFORM THE VARIABLES TO LOCARLIANS
15640
15240
1538 672 PRINT 28
      24 FORMATCHIN "FLEASE ENTER THE MAKE OF YOUR BATA FILE")
154F
1550
        INPUT, DATAFILE
        READ(DATAFILE.+)LN(1).NCASES
1568
        80 38 1=1.HCASES
157#
155#
        READ(DATAFILE,+)LN(1),HRS(1),PLOT(1),RATE(1)
        T(1) = ALOCIE(HRS(1))
1598
        II(I) = ALOCIE(PLOT(I))
1638
        12(1) = ALOCIS(RATE(1))
161#
1626 SRITE (4,26) 1.1 (1) .11 (1) .12 (1)
1638 26 FORMAT (11,12,21,F9.7,21,F9.7,21,F9.7)
1648
         SUNKRS = SUNHRS + HRS(1)
165#
         SUMII = SUMII + II(I)
 1668
         SURI2 = SURI2 + 12(1)
         SUAT = SUAT + T(1)
 1679
 1655
         SS11
             = $$11 + 11(1)+#2
         SSI2 = SSI2 + 12(1)++2
 1695
         SST
             = $$T + T(I)++2
 1788
 1718
         SURIIT = SURIIT + II(I)+f(I)
         SUMI21 = SUMI21 + 12(1)+1(1)
 1728
 1738
         SHIIIZ = SHIIIZ + II(I)+X2(I)
 1745
       38CONTINUE
 BATA CHECK OPTION SELECTION
 1768C
 1788 PRINT 35-DATAFILE
       35 FORMAT(11,"DD TOU WANT TO CHECK DATA AS IT IS READ FROM FILE ", AB," AND CONVERTED TO LOCARITHMS")
 1798
 1848 163 IMPUT-ANSWER(2)
 1815
         JF (ANSWER(2).EQ."HO") CO TO 164
 1925
         IF (ANSWER(2).EQ. "YES") CO TO 184
 1839
         PRINT," ANSWER TES OR NO OHLT PLEASE"
 1845
         CO TO 183
 18680
         PREDICTIVE ABILITY TEST OPTION SELECTION
 1885 164 PRINT 46
 1895
       45 FORMATCIX, "DO TOU WANT A COMPARISON OF THE SHORTRANCE PREDICTIVE ABILITY OF THE THU NODELS")
 1900 105 1KPUT, ANSHER (3)
 1115
          IF (ANSWER(3).ER. "NO") CO TO 186
 1725
          IF (ANSWER(3).EQ. "TES") CO TO 203
         PRINT," ANSWER TES OR NO ONLY PLEASE"
  1131
  1945
         CO TO 165
  1958 283 PRINT 42
  1965
       AZ FORMATULL, "ENTER PREDICTION MANCE (CASE NUMBERS FOR FIRST AND LAST CASES)")
  1978 1988 INPUT, ITRUNC . ITOEUP
  1986 IF (MCASES-ITRUNC+1.LE.NCASES/2-2) GD TO 186
  1995 PRINT 1964
  2000 1904 FORMAT(1H , 'NUMBER OF CASES INPUT EICEED ALLOWABLE AMOUNT--REENTER HUMBER OF CASES TO BE TRUKCATED')
```

2818 CQ TQ 1986
PROJECTION AND SERSITIVITY MATRIX OPTION SELECTION 28680 2838 186 PRINT 45 45 FORMATCHIN-DO TOU WANT PROJECTION AND SENSITIVITY MATRIX") 2634 2167 187 INPUT, ANSWER (4) IF (ANSWER(4).EQ. "NO") CO TO 188 2:15 IF (ANEWER(4).EQ. "TES") CO TO 188 2120 PRINT -- ANSWER TES OR NO ONLY PLEASE" 2134 2148 CO 10 157 BECIN DATA CHECK OPTION 21665 2188 158 IF (ANSWER (2).E0."NO") CO TO 189 2198 PRINT SEDATAFILE SE FORMAT(1H1,//175("+")./.SI,"IMPUT DATA AS READ FROM FILE "1AB." AND CONVERTED TO LOCARITHNS". 2264 22194 1,75("+")) PRINTI" LINE DIRECT LAFOR HOURS . CUM PROD FLOT FOINT + PRODUCTION RATE" 2228 PRINT," NUMBER RATION=: LOCARITHM + RATIONAL LOCARITHM + RATIONAL LOCARITHM" 2238 2240 DO- 68 1=1, NCASES PRINT 55.LN(1).HRS(1).T(1).PLOT(1).I1(1).RATE(1).J2(1) 2250 55 FORMAT(11.11.13.51.F8.2.21.F9.7." + ".F8.2.21.F9.7." + ".F8.2.21.F9.7) 2268 2278 **GROWTINUE** 2287 PRINT 65 65 FORMAT (11,75("+")) 2298 2368 169 CONTINUE 2328C 233**FC** PART II - PEARSON CORRELATION COEFFICIENTS AND RECRESSION ANALISIS 2346C CALCENTITE AND PRINT PEARSON CORRELATION COEFFICIENTS 237#C RIIT = (SURIIT-SURX1+SURT/NCASES)/SORT((SSII-(SURI)++2/NCASES))+(SSI-(SURI++2/NCASES))) 2398 RI2T = (SURI2T-SURI2+S 7158 2415 PILLZ + (SH:112-SUHI)+SUHI2/HCASES)/SORT(ISSI)-(SUHI)++2/HCASES))+(SSI2-(SUHI2++2/HCASES))) 2425 RIIII = 1.5 243# RI2I2 = 1.5 2448 RTT = 1.6 PRINT 71.RTT.RTIT.RTZT.RTIT.RTITT.RTITZ.RTZT.RTITZ.RTZTZ 2456 71 FORMAT(11,///+11+45("+")+/+41,"PEAKSON CORRELATION COEFFICIENTS "+ 2414 2478L "#ATRIX",/,;X,45("+"),//,61,"+",51,"T",61,"+",51,"X1",51,"+",51, 24892 "12",/,11,45("="),/,21,"Y",31,3("+ ",F14,7,11),/,11,45("+"),/,21, "X1"+ZX+3("# "+F1#.7+1X)+/+1X+45("#")+/+2X+"X2"+ZX+3("# "+F1#.7+1X)+//// 24925 25180 CALCULATE AND PRINT THE REGRESSION RESULTS OF THE STANDARD LEARNING CORVE NODEL 253**8** 81 *(SURI1Y-((SURI1+SURY)/NCASES))/(SSI1-(SURI1++2/NCASES)) 254# TBAR = SUM! / NCASES 2554 HRSBAR = SUTHRSINCASES

. . .

256F IIBAR + SURI1/HCASES

```
2576
         IZPAR : SURIZ/KCASES
255#
         SE + TEAR- BITIIBAR
2598
         AER = 14.++68
2646 IF (ANS (3) .EC. "NO") PRINT 775
2618 775 FORMAT (//11.75("*")./141."RESULTS OF STANDARD LEARNING CURVE HODEL")
2628 IF (AXS(3).EQ."NO")CO TO 776
2434 PRINT 75
       75 FORMAT (11.751"+") ./.141. "RESULTS OF THE STANDARD LEARNINC",
2618
26544 -
          " CURVE POGEL",/,II,75("+"),/,II,"CASE",31,"ORSERVED",SL,"PREDICTED",
          SI, "RESIGNAL", SI, "I DEVIATION")
26665
2478 776 80 118 1+1-HCASES
2683
          MATL + 67 + 81 + 11(1)
2695
          RESIDE = 1(1) - THATE
2788
          SSEL1 + SSEL1 + RESIRL ++ 2
          SSTOL1 = SSTOL1 + (1(1) - TOND ++ 2
2718
2725
          THAT . IF IF THAT
          MESTR(1) = HRS(1) - THAT
2730
          PERCENT= (RESID(1)/ KRS(1)) + 168
 2746
 2758
          SSE1 = SSE1 + RESID(1)++ 2
 2765
          SSTOL = SSTOL + (NRS(I) - NRSUAR) ++ 2
 277# WRITE ("STOLEARN", 28) THAT, RESID(1)
 278# 28 FORMAT (FE.2.F8.2)
 2798 1F (ANS (3) .EQ. "NO") CO TO 118
 2886
          PRINT 88+1+HRS(I)+THAT+RESIB(I)+PERCENT
        84 FORTAT (11, 13, 41, F0.2, 61, F8.2, 51, F8.2, 71, F6.2)
 2816
 2825
     115 CONTINUE
 283# CLOSE (FILE='STDLEARN')
 2843 CALL STSTEN ("/SORTINA STOLEARNISTBCURVEI 2R81-1+-2"+ $2860)
 2854 B0 2778 1+1,NCF
 2846 READ('STDCURVE' ++) THAT + RESID(1)
 2861 SUMRESID-SUMRESID+RESID(1)++2
 2874 1F(I.GT.1)
 2809 RESIDIF=RESID(I)-RESID(I-1)
 2018 RESIBIFZ-RESIDIF++2
 2900 RESIDUM-RESIDUN-RESIDIFZ
 2728 EH91F
 2937 2778 CONTINUE
 2948 BECTAT-RESIDSUN/SUMRESID
 2956 SIMESID-RESIDENTS
 21760
          CALCULATE AND PRINT STATISTICS FOR THE STANDARD LEARNING CURVE MODEL
  2778 2888 HEFS-HCASES-2
  2000
2015
            1858 + (SS70L1 - SSEL1)
            THEEL + SSEL1 / HAPB
  2421
            SEE - SORT (THSEL)
  2626
            WHEN + SEE / (1 / MCASES + 1134R ++2 / (SSI1 - (SHIII ++ 2 / MCASES)))
  3646
            SENS - SORT (VARIA)
  3856
            SEN1 + SEE / (SORT (SSE) - (SUTE) (#2/WEASES) ) }
            HIGH = (SSTOLI - SHELI) / SSTOLI
  3644
            #$0A1 = ($$701- $$E1) / $$701
            FRATIO: THSRL / IRSEL
```

PLEANN= (15 ++ (8) + ALOCIS(2,8))) + 100

-

3168 FRINT ST. DR. SEER. AER. BI. SEEL . RSGLI. SEE. THSEL. THSRL . FRATIO. NOFO. RSGAL. PLEARN, DUSTAT 3115 81 FORMAT(11,75("+"),/,11,"THE EQUATION FOR THIS MODEL IS: "+ 31276 1641 = 28 + 11 ++ 61"+/+)1+ "IN LOG FORM THIS MODEL RECOMES: LOGITHATS = LOGIERS + BL + LOGITS". 31364 31475 /.11. "WHERE: LOG(68) =".F8.5.41."ST8 ERADR =".F8.5.41."B8 =".F11.5. /11311"E1 =""F8.5.41,"STD ERROR =""F8.5" 31588 31676 /.11."EUMART STATISTICS:"./.11. "R SQUARED LOC =""FT.5.1#1,"STD ERROR EST =""FT1.1./.11. 31785 31626 "KSE",131,"=",F9.5,81,"KSR",111,"=",F9.5,/,11, 31588 "F RATIO",91,"=",F9.4,81,"D. F. (N/D) = 1/",I3,/11, 32886 "R SOUGRED ACTUAL =",F7.5.81."LEARNING FACTOR =",F9.5." PERCENT", JZ1FE /IL. OURBIN-WATSON STATISTIC="F9.6 32286 J+11+75("+")) CALCULATE AND PRINT THE RECRESSION RESULTS FOR THE REDUCED HAS VS RATE MODEL 32490 326# B2 *(SUM121-((SUM12*SUM1)/NCASES))/(SS12-(SUM12**2/NCASES)) 3278 BU = IFAR - B2 = IZBAR 3282 AP#=1#++8# 3255 IF (AHS (3).EQ. "TES") CO TO 3828 3368 PRINT 628 3314 828 FORMAT(//11.75("+")/111, "RESULTS OF RECRESSION ON PRODUCTION RATE VARIABLE ALONE") 332F CO 10 3866 3335 3829 PRINT 52 \$2 FORMAT(11,75("+"),/,111, "RESULTS OF RECRESSION ON PRODUCTION", 3345 33598 " RATE VARIABLE ALORE":/. [1,75(":")./.11:"CASE":31:"DBSERVED":51: 33641 "PREDICTED", 51, "RESIDUAL", 51, "I DEVIATION") 3378 3868 DO 111 1=1.NCASES 3386 THATL = BS + B2 + 72(1)RESIDE = T(E) - THATE 339# 3468 SSEL2 = SSEL2 + RESIDL ++2 3418 SSTOL2 = SSTOL2 + (T(I) - TEAR) ++ 2 THAT = 18 ++ THATL 3425 RESID(I) = HRS(I) - THAT 3438 344# PERCENT= (RESIB(1)/ HRS(1)) + 100 3456 SSE2 = SSE2 + RESID(1)++2 SSTOZ = SSTOZ + (HRS(I) - HRSBAR) ++ 2 3466 3478 WRITE ("REDHOURS", 28) THAT, RESID(1) 346# IF (ANS (3) . E9. "NO") CO TO 111 349# PRINT 86. I. HRS(1), THAT, RESID(1), PERCENT 3544 111 CONTINUE 3585 CLOSE (FILE + 'REDHOURS') 351# CALL STSTEK('/SORT+++ REDHOURS(REDCURVE(2R8)-1,-2'+\$3348) 3528 DO 3314 I+1, RCASES 353# READ('REDCURVE'++) THAT (RESID(1) 3531 SURRESID-SURPESID-RESID(1)++2 3548 IF(1.GT.1) 355# RESIDIF=RESID(1)-RESID(1-1) 3568 RESIDIF2+RESIDIF++2 3571 RESIDSUM=RESIDSUM+RESIDIF2 3598 EKDIF 3688 3314 CONTINUE

٦.

```
3618 EXSTAT=RESICSUM/SUMRESID
362P SUMAESID-RESIDSUM=#
CALCULATE AND PRINT STATISTICS FOR THE REDUCED HRS VS RATE RECEL
36480
JALP J347 THSRL= (SSTOLZ-SSEL2)
         TRSEL . SSEL2 / KOFD
3478
3657
         SEE = SORT (THSEL)
3650
         VARBA = SEE / (1 / NCASES + IZBAR ++ Z / (SSIZ - (SUNIZ ++ Z / NCASES)))
3795
         SEEB = SORT (VAREA)
         SERZ = SEE / (SGRT (SSI2 - (SUNI2 ## 2 / NCASES)))
3716
372
         RSQL2 = (SSTOL2 - SSEL2) / SSTOL2
3738
         RS0A2 = (SS102- SSE2) / SST02
3744
         FRATIO: THSRL / THSEL
3754
         PRINT 83.80.SEB8.ARG.82.SEB2.RSQL2.SEE.THSEL.THSEL.THSEL.FRATID.NDFD.RSG.2.DUSTAT
3766 63 FORMAT(1175("+")/IX"THE EQUATION FOR THIS MODEL IS: "
         -
              THAT = B# + 12 +> 52"+/+11
37781
37241
         "IN LOG FORM THIS MODEL RECORES: LOCITHAT) = LOCIES) + 62 + LOCIE2)",
37988
         /111, "WHERE: LOC(53) =", F8.5,41, "SID ERROR =", F8.5,41, "## =", F11.5,
38796
          /131,"BZ ="1F8.5.41,"STD ERROR ="1F8.5.
39185
          /.11."SUMMART STATISTICS:"./.11.
362#£
          "R SQUARED LOC =""F7.5, ISI:"STD ERROR EST =""F11.4./.11,
          "#SE",131,"=",F9.5,81,"#SR",111,"=",F9.5./,11.
36321
          "F RATIO"+91+"="+F9.4+61+"D. F. (N/D) = 1/"+13+/+11+
36481
38554 "R SQUARED ACTUAL="F7.5/11"DURBIN-WATSON STATISTIC="F9.6/1175("+"))
CALCULATE AND PRINT THE RECRESSION RESILTS FOR THE FULL MODEL
 3676C
 GERON = ((SSX1-X1EAH+SUNX1)+(SSX2-X2EAR+SUNX2) - (SLIX2-X1BAR+SUNX2)++2)
 3598
 392E
          B1 =((SSI2-I2BAR+SUNI2)+(SUNI11-I1BAR+SUNI) -
 39186
              (SHI1X2-IIBAR+SUNIZ)+(SUMXZY-IZEAR+SUNY))/DENON
          82 = ((SSI1-IIBAR+SUNII) +(SURIZT-I2BAR+SUNI) -
 3925
             (SNIIXZ-XIBAR+SIR(X2)+(SUNXIY-XIBAR+SUNT))/DENON
/39388
 3946
          SE = TEAR-B1+IIDAR-B2+I2BAR
 395$
          AB# = 18.++88
 3968 SF (ARS (3) .E2." TES") CO TO 4328
 3978 PRINT 848
 3908 848 FORMAT (//11,75("")/61, "RESULTS OF CONBINED CUMULATIVE PRODUCTION AND PRODUCTION RATE NODEL")
 3998 CO TO 4368
 4596 4325 PRINT 84
        84 FORMAT(11,75("+"),/161,"RESULTS OF CONBINED CUMULATIVE PRODUCTION",
 4616
 49282
          * AND PRODUCTION RATE HODEL",/,11,75(";"),/,11,"CASE",31,"OBSERVED",51,
           "PRESICTED", SI, "RESIDUAL", SI, "I DEVIATION")
 48398
 4848 4368 00 112 1=1+HCASES
 4154
           THATL = 54 + 81 + 11(1) + 82 + 12(1)
          RESIDL= 1(1) - THATL
 4466
 4$7$
           SSEL = SSEL + RESIDL ++ 2
 4853
           SSTOL = SSTOL + (T(1) - TEAR) ++ 2
 4195
           THAT = 19 ++ THATL
  41##
           RESID(1) = HRS(1) - YHAT
           PERCENT: (RESID(1)/ HAS(1)) + 188
 4116
  4120
           SSE = SSE + RESID(1)++ 2
```

```
(13)
         SSTD = SSTD + (HRS(1) - HRSBAR) ++ 2
4145 WRITEI"FULLMODL", 26) THAT, RESID(1)
4152 (F(ANS(3).E2."#3")CO TO 112
(162
         PRINT SP. L.KRS(1), THAT, RESID(1), PERCENT
4171 112 CONTINUE
(175 CLOSE (FILE= 'FULL KODL')
AIEF CALL SISTER('/SORT### FULLMODLIFULCURVE;2R8;-1+-2',$3894)
4198 DO 3864 1=1-NCASES
4209 READLIFULCURVE' +) THAT - RESID(1)
4241 SURRESID=SURRESID+RESID(1)++2
421# IF(L.GT.1)
122# RESIDIF=RESID(1)-RESID(1-1)
4238 RESIDIFZ=RESIDIF++2
1218 RESIDSUN=RESIDSUN+RESIDIF2
1268 ENDIE
4275 3864 CONTINUE
4287 DESTAT-RESIDSUM/SUMMESID
4298 SUMRESID=RESIDSUM=0
KGPEC
        CALCULATE AND PRINT STATISTICS FOR THE FULL MODEL
4330 3890 KOFD=NCASES-3
         TRSRL = (SSTOL - SSEL) / 2
1348
(254
         TRSEL = SSEL / NOFD
136
         SEE . SORT (THESEL)
(378
          ZVAL + MCASES+(SSI1 + SSI2 - SMI1X2 ++ 2) - SUMI1+(SUNI1 + SSI2 -
43298
                SHILLZ & SUNIZE + SUNIZE (SUNILE + SHILLZ - SSILE + SUNIZE)
439#
          AVAL = (SSI1 + SSI2 - SHIII2 ++ 2) / ZVAL
1428
         VARB# = THSEL + AVAL
4418
          SEB8 + SORT (VARBB)
4428
          SEB1 = SORTILITESEL + (SSIZ - X2BAR + SUMIZI) / DENONI
(436
          SEB2 = SURT((INSEL + (SSI) - IIBAR + SUNII)) / DENOMI
1448
          RSQL = (SSTOL - SSEL) / SSTOL
445#
          RSDA = (SSTO - SSE) / SSTO
4468
          FRATIO: THSAL /TESEL
4478
          FB1 = (RSQL - RSQL2) / ((1 - RSQL) / (HCASES - 3))
          FB2 = (RSQL - RSQL1) / ((1 - RSQL) / (NCASES - 3))
448#
          PRINT 85.09.SEBB.AB9.81.SEB1.FB1.62.SEB2.FB2.RSQL.SEE.TKSEL.TKSRL.FRATIO.KDF0.RSQA.DKSTAT
449#
454
       85 FORMAT(11,75("1"),/,11,"THE EQUATION FOR THIS MODEL IS: ":
LSIAL
               THAT = BE + 11 ++ B1 + 12 ++62" // 111+
45284
          "IN LOG FORM THIS MODEL BECOMES: LOG(THAT) = LOG(BB) + BI + LOG(X1) + 52 + LOG(X2)",
(5364
          /.11."WHERE: LOG(20) =".F8.5.41."STO ERROR =".F8.5.41."E8 =".F11.5.
          /.131."B1 =",F8.5,41,"STD ERROR =",F8.5,41,"F+ =",F16.4./,
45485
455#£
          131."BZ =""F8.5.41."STB ERROR =""F8.5.41."F4 =""F18.4./.11
          "SUMMART STATISTICS:",/.II. "R SQUARED LOC =":F7.5.181.
45652
          "SID ERROR EST =".F11.4.7.111."MSE".131."=".F9.5.8X.".SR".11X."=".F9.5.7.1X.
(5781
(5228
          "F RATIO", 91,"=",F9.4,81,"D. F. (N/D) = 2/",13,/,11,
45986 "R SOUARED ACTUAL="F7.5/11"DUREIN-HATSON STATISTIC="F9.8/11/5("+"))
46180
46290
        PART III - PREDICTIVE ABILITY TEST OPTION
46380
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{{{}

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IF (ANSWER(3).EC. "NO") CO TO 114
{ESF
Able IF (ANS (3) .EC. "NO")PRINT 4173
4661 ITEUNC=NCASES-ITEUNC+1
ALTE ITOEUF=NCASES-ITOEUP+1
4556 DO 113 I=ITOEUP, ITRUNC
          ITEST = MCASES + 1 - 1
4698
4788 4173 FORMAT(//)
(71# IF (ANS (3) .EC. "NO") CO TO 498#
4726
           FRINT 86, ITEST, HRS (ITEST)
        86 FORMAT(11,116(""),/,11,"",371,"SKORTRANCE PREDICTIVE ABILITY ",
473#
4748£
           "COMPARISON",371."+"./.11."+".161.
            "THE DATA PRESENTED BELOW IS FOR CASE "".13." WHICH HAS AN OBSERVED",
475EL
4768£
           " VALUE OF: "+F9.2+161+"+"+/+
           11,116("+")./11,"+".31."/".31,"/".91."REDUCED (LEARNING CURVE) ".
47786
            "NODEL".SI, "++", 3I, "FULL (CUMULATIVE PRODUCTION & PRODUCTION RATE) ",
47886
            "NODEL",2X,"#",/,11,"#"," CASES ",188("#"),/,11,"# USED # "#
47986
            "PREDICTION + 2 DEVIATION + EST BE + EST BI ++ "+
19932
 48185
            "PREDICTION + I DEVIATION + EST B# + EST B1 + EST B2 +"+
           /+11.116("+"))
 (SZAL
 4838 4988 DD 114 J=1.ITRUNC
            ICASES = ITEST - J
 4848
 4654
            SUNT = 4
            SUNT1 = 4
 4560
 4576
            SUMIZ = #
            SSI1 = #
SSI2 = #
 4884
 4895
            SUMILY = 4
 1968
 4918
            SUMIZT = 4
 4928
            SX1112 = 6
           DO 115 K=1+1CASES
 4936
            SUNT = SUNT + T(K)
 4948
  4950
            SUNII = SUNII + II (K)
            SUMIZ = SUMIZ + IZIK)
  4966
  497#
             SSI1 = SSI1 + I1(K) ++ Z
             SS12 = S512 + I2(X) ++ 2
  4986
  4995
             SUMIIT = SUMIIT + II(K) + T(K)
             SUNIZY = SUNIZY + IZ(K) + T(K)
  5466
             SHI112 = SHI112 + 11(K) + 12(K)
  5018
  5828 115 CONTINUE
             ICOUNTA = ICOUNTA + 1
  5836
  5848
             TBAR = SUNT / ICASES
             11EAR = SUHI1 / ICASES
  5858
             IZBAR = SUNIZ / ICASES
  5868
             BIR . (SUNILIT - (ISUNIL + SUNT) / ICASESI) / ISSEL - ISUNIL + 2 / ICASES)
  5174
              DER = TDAR - DIR + IIBAR
  5484
              AB6R = 14 ++ 25R
   5998
              THATE + 18 ++ (BOR + BIR + E1(ITEST))
   5185
              DEVR + HRS(ITEST) - THATR
   5115
              ABEVR (ICOUNTA) + ABS (DEVR)
   5121
              SUMADEVR = SUMADEVR + ADEVRIICOUNTAL
   5136
              PDEVR = 188 + DEVR/HRS(ITEST)
   5146
   5156
              APDEVR = ASS (POEVR)
```

.. . . .

```
IF (APDEVE.CT.18.8) CO TO 281
5:16
          ICOUNTER + ICOUNTER + 1
5176
          IF (AFDEVR.CT.S.C) CO TO 281
5162
          ICCUNTER = ICOUNTER + 1
5194
SZER ZRI BENGA = (ISSZI-ZIEZRASUMII)AISSIZ-IZEARASUMIZ) - ISHIIZZ-IIBARASUMIZIAAZI
          SIF = (ISSI2-IZEAR+SURI2)+ISURIII-IIEAR+SURI) -
5218
52244
                 (SHIIIZ-IIEAF+SURIZI+(SURIZI-IZBAR+SURI))/DENOR
5232
          E2F
               = ((SSI1-IIEAR+SUMI1)+(SUMI21-IZEAR+SUMI) -
SZAPL
                  (SMIIIZ-IIEAR+SUMIZ)+(SUMIIT-IIBAA+SUMI))/DENOM
              = 18AR - 81F + 118AR - 82F + 126AR
5256
          BEF
5260
          ABAF = 19 ++ BEF
          THATF = 10 ++ ISOF + BIF + LI(ITEST) + B2F + IZ(ITESTI)
5276
5289
          DEVF + HRS(ITEST) - THATF
5296
           ADEVF (ICOUNTA) + AES (DEVF)
5388
          SURADEVF = SURADEVF + ADEVF (ICOUNTA)
5314
          PDEVF = 128 + DEVF/HRS(ITEST)
5325
           AFBEVE = AESIPDEVE)
5334
           IF (APDEVF.GT.18.8) CO TO 282
           ICOUNTEF = ICOUNTEF + 1
5348
 535#
           JE (APDEVF.GT.S.E) CO TO 202
 5366
           ICOUNTEF = ICOUNTEF + 1
 5378 282 IF (ANS (3) .EQ. "RO")CO TO 114
        FRINT 87. ICASES, THATE, POEVR, ABJR, BIR, THATF, FOEVF, ABEF, BIF, BZF
 538#
 5396
        87 FORMAT(11, "#"+21, 13, 21, "+"+11, F9. 2, 21, "#", 31, F6. 2, 41, "+"+F9. 2, 11,
           ***,F8.5,11,****,11,F9.2,21,***,31,F6.2,41,***,F9.2,11,***,F8.5,11,
 54696
 54126
           "#",F8.5,1X,"#"}
 5428 114 CONTINUE
 5438 IF (ANS (3) . EQ. "NO") CD TO 5598
           PRINT 88
 5446
        88 FORMAT(11+116("+")+/////)
 5456
 5468 5598 COUNT=COUNT+1.
           FLAG1 = COUNT / 2.4
 5178
           FLAC2 + FLAG1 - INTIFLACI)
 5486
           IF (FLAGZ.NE.S.S) GO TO 113
 5198
 SSP# 113 CONTINUE
 5518
           AVCADEVR = SUNADEVR / ICOUNTA
           AVCADEVE = SUMADEVE / ICOUNTA
 $526
           B0 119 I =1.ICOUNTA
 553#
           SSDEVR = SSDEVR + (ADEVR(1) - AVCADEVR)++2
 3546.
 555#
           SSDEVF = SSDEVF + (ADEVF(1) - AVCADEVF)##2
 5568 119 CONTINUE
 CALCULATE AND PRINT RESULTS SUMMART FOR PREDICTIVE ABILITY TESTS
  558øC
 VARADEVR = SEDEVR / (ICOUNTA - 1)
  56F#
            VARADEVF = SSDEVF / (ICOUNTA - 1)
  5618
            TESTSTAT = (AVCADEVR-AVCADEVF)/SQRT((VARADEVR/ICOUNTA)+(VARADEVF/ICOURITA))
  56ZØ
  5636
            PCENTER + 168 + ICOUNTER / ICOUNTA
  564#
            PCENTCR = 100 + ICOUNTCR / ICOUNTA
  5658
            PCENTEF + 108 + ICOUNTEF / ICOUNTA
            PCENTOF = 100 + ICCUNTOF / ICOUNTA
  5666
```

PRINT 95-AVCADEVR.AVCADEVF.VARADEVR.VARADEVF.TESTSTAT.ICOUNTA.

```
26552
          ICOUNTA, ICOUNTER, ICOUNTER, PCENTER, PCENTER, ICOUNTCR, ICOUNTCR, PCENTCR,
21925
          PCENTUF
       95 FORFAT(11.67(""")./.11.""".161,"SUBMART OF FREDICTIVE ABILITY TESTS".
1728
57186
          " RESULTS"+121, "" +/+11+67 ("") +/+11."" +", SI. "ITERS OF INTEREST", BI.
          ** REDUCED NODEL + FULL RODEL +" . /. 11.67 ("+") . /. 11. " AVERAGE ",
57288
          "AESOLUTE DEVIATION",71,"",31,F9.2,31,"",21,F9.2,31,"",/,11,
57364
           ** VARIANCE OF ABSOLUTE DEVIATIONS", 21, """, 11, F11, 2, 31, "", F11, 2, 31,
57426
          "+"+/+11+"+ TEST STATISTIC (SEE NOTE)"+81+"+"+61+"---"+61+"+"+21+
575#£
          F9.2.31, """,/.11,"I TOTAL NUMBER OF TEST SITUATIONS +".61.13.61,"I"
57645
          57786
           "+".51.13.61."+"./.11."+ PERCENT OF PREDICTIONS WITHIN ST +".61.F4.8.
$7646
          SI, "+", SI, F4.4, SI, "+", /, II, "+ NUMEER OF PREDICTIONS WITHIN IST +",
$792$
          41.13.41.""".SI.13.61.""./.11."+ FERCENT OF PREDICTIONS WITHIN 1921",
55224
           61.F4.8.51.****.51.F4.8.51.****//11.67(***)//11.**NOTE: IN TESTING FOR *.
58146
SEZPE
           "STATISTICAL SIGNIFICANCE USE STUDENT'S T DISTRIBUTION",/,1X
           "IF THE NUMBER OF TEST SITUATIONS ARE LESS THAN AND OTHERWISE ",
55386
58428
           "USE STANDARD", /, II, "NORMAL DISTRIBUTION. IN EITHER CASE THIS IS ",
58566
           "A DNE TAILED TEST. IF", /.IX. "THE TEST STATISTIC IS GREATER THAN ",
           "THE CRITICAL STATISTIC ONE MAT", /. 11, "CONCLUDE THAT THE AVERAGE ",
 38688
           "ABSOLUTE DEVIATION OBTAINED WITH THE FURL" 1/11, "RODEL IS ",
 59724
           "SIGNIFICANTLE LESS THAN THAT OBTAINED WITH THE REDUCED NODEL.")
 198222
 SST# FRINT, "FILES LOCFILE, STOLEARN, REDHOURS, AND FULLNOOL WRITTEN."
 5916C
 59260
          PART IV - PROJECTION AND SENSITIVITY MATRIX OPTION
 59380
 5958 116 IF (ANSWER(4).EQ."NO") CO TO 125
 5968
           ADDPLOT = PLOT (XCASES)
 5976
          DO 117 1=1-166
 5986
           ADDPLOT = ADDPLOT + .01 + PLOT(NCASES)
 599₽
           NEWPLOT(I) = INT(ADDPLOT)
 6468
           ADDRATE = .68 + RATE (NCASES)
 6615
          00 118 J=1+9
           ADDRATE = ADDRATE + .1 + RATE INCASES)
 6828
 6838
           PRORATE(J) = ADORATE
 6548
           FHRS(I,J) = ABB + NEWPLOT(I)++B1 + PRORATE(J)++B2
 6E56
      118 CONTINUE
 6969
       117 CONTINUE
 657$
           ISTART = 1
 6589
           ISTOP = 50
 6898
           DQ 12# K=1+2
 6166
           PRINT 89. (PRORATE(J).J=1.9)
 6118
         ST FORMAT(11.113(""")./.11."", 391, "PROJECTION AND SENSITIVITT MATRIX",
 61281
            391, "*", /, 11, 113("*"), /, 11, "* PROJECTED (", 311, "PROJECTED PRODUCTION",
            " RATES", 361, "+", /. 11, "+ CURLATIVE +", 99(""), /, 11, "+
 6139£
                                                                ukits 📲,
  61466
            *(F$.2,ZI,"+"),/,1I,113("+"))
           00 121 1=1START, 1STOP
 6156
  6165
            PRINT 98.NEWPLOT(I), (FHRS(I,J), J+1,9)
  6176
         98 FORMAT(11."*",31.16.31."*",9(11.F8.1.11."*"))
  6188
       121 CONTINUE
```

619#

PRINT 11

£277 91 FORMAT(11,113(-+-)) 621E FRINT92 TE FORMATCIE, "KOTE: 1. PROJECTED VALUES FOR DIRECT LARDE HOURS HAT ", 6228 "BE READ FROM THE ADOVE MATRIX BY MATCHING & CIVEN PRODUCTION" ./. 11. 62328 "RATE WITH A GIVEN NUMBER OF CURREATIVE UNITS AND READING THE ", 35126 "VALUE FOR DIRECT LGOOR HOURS FOUND AT THE INTERSECTION", /, 11, 62585 "OF THE CORESPONDING ROW AND COLUMN. FORECASTING HODEL IS THE ". 62668 "CUMULATIVE FRODUCTION & PRODUCTION RATE RODEL.", J. 71, "Z. PROJECT", 62785 "ICN INTERVAL FOR CUMULATIVE UNITS IS IN OF THE LAST DESERVED VALUE". 62888 23953 " OF CUMULATIVE UNITS. ",/,71,"3. PROJECTION VALUES FOR PRODUCTION ", "RATE ARE 78, 28, 98, 188, 118, 128, 138, 148, AND 158 PERCENT OF ", 636**8**£ 13151 "THE", /, 11, "LAST OBSERVED VALUE OF PRODUCTION RATE.") 6328 ISTART = 51 633# ISTOP = 188 6345 126 CONTINUE 635# 125 STOP1 1365 EKD

Sample PRODRATE Output

This next section provides a sample output of the abbreviated and full format options using simulated data. The data base was developed by Stevens and Thomerson (15:127) to demonstrate how the PRODRATE program works. It should be noted the data were developed to demonstrate superior results for the full model. The program instructions are presented first, then the abbreviated format followed by the full format. This comparison of the optional formats will, hopefully, demonstrate the value of the abbreviated option.

PRODRATE INSTRUCTIONS

THIS PROGRAM IS DESIGNED TO EVALUATE THE VARIATION IN DIRECT LADOR REQUIREMENTS AS A FUNCTION OF CUTULATIVE FRODUCTION AND PRODUCTION RATE. IN AGDITION, THE ANALYST MAT COMPARE THE RESULTS OFTAINED FROM THE STANDARD LEARNING CURVE WITH THE RESULTS OFTAINED FROM THE CURULATIVE PRODUCTION AND PRODUCTION RATE MODEL. THE COST MODELS USED IN THIS PROGRAM ARE:

1. REDUCED HODEL (STANDARD LEARNING CURVE HODEL)

T = 55 + (X1 ++ 51) + (15 ++ 5)

2. FULL MODEL (CUMULATIVE PRODUCTION AND PRODUCTION RATE HODEL)

X = BF 4 (X1 44 \$1) 4 (X2 44 \$2) 4 (16 44 E)

INERE:	1	
	11	

5

- II IS THE CURULATIVE PRODUCTION FLOT FOINT IZ IS THE PRODUCTION RATE PROTICE.C. EQUIVALENT UNITS PER NONTH)
 - REFRESENTS THE ERROR TERM
- BO, BI, AND BZ ARE PARAMETERS DETERMINED BT REGRESSION

IS THE DIRECT LACOR REQUIREMENTS

BATA ARE INPUT DI READING FROM ANT PROPERLI FORMATTED DATA FILE. TOUR DATA FILE SHOULD DE SAVED TO ANT PERMAMENT FILEMARE. TOU WILL DE ASK TO IMPUT THE MAME OF TOUR DATA FILE AT THE APPROPRIATE STEP IN THE PROCRAM. THE MAME OF TOUR DATA FILE CAR MOT EXCEED & CHARACTERS. THE FIRST LINE OF THE DATA FILE MUST CONTAIN A LINE NUMEER AND THE MUMBER OF CASES TO BE READ. THE DATA IS THEN ENTERED ONE CASE PER LINE IN THE FOLLOWING GROER: LINE NUMBER, ODSERVED DIRECT LADOR REGUIREMENT (T), CUMULATIVE PRODUCTION FLOT POINT (X1), AND FRODUCTION RATE PROIT (T2). THE PROGRAM USES A FREE FIELD REDINTIONER FORF, EACH VARIABLE MUST DE SEPARATED DI AT LEAST DRE SFACE (OR OTHER BELINITED DIT HO DIMER SPECIAL FORMAT IS REQUIRED. AN EXAMPLE OF A DATA FILE WITH 5 CASES IS PRESENTED EELOW:

166	5		
161	196	1.5	9.5
162	95	36	2 f .5
1\$3	86	55	25
164	75	82	27
165	71	113	31

ONE ADVANTACE OF THIS FROCRAM IS THAT THE RESULTS OCTAINED WILL SE IN THE SAME UNITS AND FORM AS THE INFUT DATA. FOR EIGHPLE, IF TOU ARE WORKING IN BIRECT LAROR HOURS FER HOWTH AND EQUIVALENT UNITS, THE RESULTS WILL SE IN TERMS OF THESE UNITS. ALSO, IF TOU WISH TO USE A CUMULATIVE AVERACE APPROACH, ALL TOU WEED DO IS ACCRECATE THE BATA BASE IN THAT HANNER.

THE PROCEAN BECING BT TRANSFORMING THE INFUT BATA TO COMMON LOCARITHMS. LOC LINEAR RECRESSION IS THEN PERFORMED AS FOLLOWS: T RECRESSED ON II. T RECRESSED ON II. AND FINALLT I RECRESSED ON EDIN II AND II. ODSERVED DIRECT LADOR REQUIREMENTS, FREDICTED DIRECT LADOR REQUIREMENTS, AND RESIDUALS ARE PRINTED IN ORIGINAL (UNTRANSFORMED) FORM FOR EACH REGRESSION SITUATION. IN ANDITION, SUMMART STATISTICS ARE PRINTED FOR EACH ROOEL. THE SUMMART STATISTICS INCLUDE TWO COEFFICIENTS OF GETERRINATION R SCHARED LOC AND R SOLARED DATA (LOC FORM). THE R SCHARED ACTUAL, ON THE OTHER NAME, IS COFFUTED DSING THE UNTRANSFORMED RESIDUALS, AND IS REFRESENTATIVE OF NOW WELL THE MODEL FITS THE UNTRANSFORMED DATA. THE BURGHTMANS, AND IS REFRESENTATIVE OF NOW WELL THE MODEL FITS THE UNTRANSFORMED DATA. THE BURGHTMANS, AND IS REFRESENTATIVE OF NOW WELL THE MODEL FITS THE UNTRANSFORMED DATA. THE BURGHTMANS, AND IS REFRESENTATIVE OF NOW WELL THE MODEL FITS THE UNTRANSFORMED DATA. THE BURGHTMANS, AND IS REFRESENTATIVE OF NOW WELL THE MODEL FITS THE MAINSFORMED DATA. THE BURGHTMANS, AND IS REFRESENTATIVE OF NOW WELL THE RODEL AS ANTOCORRELATION OF THE RESIDUALS. SEVERAL OFFICING ATE AVAILATLE WITHIN THIS FROUTAR AND CAN BE SELECTED DI APPROPRIATE ANSWERS TO THE FOLLOWING CUESTIONS:

1. DO TOU MANT TO CHECK DATA AS IT IS READ FROM FILE AND CONVERTED TO LOCARITHMS?

- TES WILL CAUSE THE FRINTING OF A LISTING OF THE RATIONAL INFUT BATA AND THE ASSOCIATED LOGARITHMIC VALUES.
- KO SUFFRESSES THIS OPTION.
- 2. CONFLETE PRINTOUT?
- IES WILL CAUSE OUTPUT TO BE PRINTED IN FULL FORMAT AS DESCRIBED ADOVE. NO - VILL DELETE THE LISTING OF OBSERVED, PREDICTED, AND RESIDUAL VALUES DETWEEN TABLES OF SUMMART STATISTICS. IT WILL ALSO DELETE LISTING OF INDIVIDUAL NATRICES FOR THE SHORTRANGE PREDICTIVE ADILITY OPTIONIT.E., ONLY THE SUMMART TABLE WILL DE LISTED.

3. DO TOU WART A CONFARISON OF THE SHORTRANCE FREDICTIVE ABILITY OF THE TWO MODELS?

TES - WILL CAUSE THE PREDICTIVE ADILITY TEST OPTION TO BE ACTIVATED AND THE USER WILL BE TOLD: "ENTER PREDICTION RANCE (CASE NUMBERS FOR FIRST AND LAST CASES)." THE USER SHOULD ENTER THE MURDER OF THE FIRST CASE TO BE PREDICTED FOLLOWED BT THE LAST CASE TO BE FREDICTED. SEPARATED BY A CONTA. THE CASE MURBERS MUST BE INTEGER VALUES CREATER THAN OR EQUAL TO 2. THE FREDICTIVE ABILITI TEST SINULATES FUTURE PREDICTIONS BT PERFORMING A STEPHISE TRUNCATION OF THE HISTORICAL DATA. FOR THIS REASON, AN UPPER LIMITATION ON THE NUMBER OF CASES TRUNCATED HOULD DE: ((TOTAL NUMBER OF CASES IN DATA FILE) / 2) - 2 FOR EXAMPLE. IF TOUR DATA FILE CONTAINS SE CASES. TOUR UPPER LINE NOULD BE 23 CASES. THIS, OF COURSE, REPRESENTS ONLY THE MALINUM NUMBER OF CASES THAT COULD BE TRUNCATED. IN PRACTICE TOU RAY WANT TO TRUNCATE ONLY & SHALL NUMBER OF CASES. TRUS, IF TOUR BATA IS COLLECTED IN NORTHLY INTERVALS, TOU CAN LOOK AT THE PREDICTIVE ABILITT OF THE FULL AND REDUCED NODELS FOR AN 18 NONTH TIME SPAN BY SPECIFYING AN IS CASE RANCE. IF YOUR DATA IS COLLECTED IN GUARTERS, YOU CAN LOOK AT THE PREDICTIVE ABILITY OF DOTH MUSELS FOR AN 18 MONTH TIME SPAN BT SPECIFTING "". AFTER ALL PREDICTIVE ACILITY TEST SITUATIONS ARE PRINTED. THE PROGRAM PRINTS A SUMMART OF THE TEST RESULTS.

NO - SUPPRESSES THIS OPTION.

4. BO TOU WANT PROJECTION AND SENSITIVITY MATRII?

TES - WILL CAUSE FAINTING OF PROJECTION AND SENSITIVITT NATRII. THIS NATRII PRESENTS PROJECTED DIRECT LADOR REQUIREMENTS FOR SELECTED FAIRS OF CUMULATIVE PRODUCTION PLOT POINTS AND PRODUCTION RATES. THE PROJECTION INTERVAL FOR THE CUMULATIVE PRODUCTION PLOT FOINT IS IX OF THE LAST OBSERVED VALUE. THE PROJECTION VALUES FOR PRODUCTION RATE ARE 70. 00. 100. 100. 120. 130. 140. AND 150 PERCENT OF THE LAST OBSERVED VALUE OF PRODUCTION RATE.

NO -SUPPRESSES THIS OFTION.

#**SPECIAL NOTE*** THE PREDICTED DIRECT LABOR REQUIREMENTS AND RESIDUALS FOR EACH NODEL ARE STORED IN SEPARATE FILES. THE VALUES FOR THE STANDARD LEARNING CURVE MODEL ARE STORED IN A FILE CALLED 'SIDLEARN'S THE VALUES FOR THE PRODUCTION RATE VARIABLE ALONE HODEL IN THE FILE 'REDMOURS'S AND THE VALUES FOR THE CONCINED CUN. PRODUCTION AND PRODUCTION RATE MODEL IN THE FILE 'FULLMODL'. USERS MAT ACCESS THESE FILES FOR RESIDUAL ANALISIS BT OTHER COPPER IMPACT STATISTICAL PROCEARS, IF DESIRED.

FEARSON CORRELATION COEFFICIENTS MATRIE

RESULTS OF STANDARD LEARNING CURVE MOLEL

.

 INE ECUATION FOR THIS MODEL IS:
 INAT = £8 + 11 ++ 81

 IN LOC FGRN THIS MODEL DECOMES:
 LOC(THAT) = LOC(DE) + E1 + LOC(T1)

 ENERE:
 LOC(BB) = 3.49572
 STB ERROR = \$.13455
 B8 = 3131.24884

 E1 =-0.26242
 STB ERROR = \$.164433

 SUMMART STATISTICS:
 R SCUARED LOC =\$.99115
 STD ERROR EST = \$.6164

 KSE
 = \$.64627
 KSR
 = 1.14396

F RATIO =4255.4005 D. F. (K/G) = 1/ 38 R SOUARED ACTUAL=6.90301 LEARWING FACTOR = 82.20945 PERCENT DURBIN-WATSON STATISTIC= 8.327753

RESULTS OF RECRESSION ON PRODUCTION BATE VARIABLE ALONE

 ECOUNTION FOR THIS HODEL IS:
 IMAT = 80 + 12 ++ 82

 IN LOG FORM THIS HODEL ECORES:
 LOG(1047) = LOG(80) + 82 + LOG(12)

 WRERE:
 LOG(80) = 3.25379
 STD ERROR = 6.23957
 80 = 1793.64990

 E2
 =0.74372
 STL ERROR = 0.02173

 SUMMART STATISTICS:
 R
 SUMMART STATISTICS:

 R SQUARED LOG =0.94854
 STB ERROR EST = 0.02309

 RSE = 0.00996
 RSR = 1.11700

 F RATIO =1145.7958
 3. F. IN/D1 = 1/ 38

 R SCUARED ACTUAL=0.75679
 BURBIN-WATSEN STATISTIC= 0.277285

RESULTS OF CONDINED CUMULATIVE PROPUCTION AND PRODUCTION RATE RODEL

THE EQUATION FOR THIS MODEL IS: THAT = B0 + II ++ B1 + I2 ++ B2 IN LOG FORM THIS MODEL DECOMES: LOG(TWAT) = LOG(B0) + B1 + LOG(II) + B2 + LOG(IZ) UNERE: LOG(50) = 3.75000 STD [RROR = 0.00116 E0 = 5672_04448

. . .

STD ERROR = 4.00116 EF = 5672.04648 E1 =-#.59957 STD ERROR = 0.00134 F+ =68532.2189 STD ERROR = 4.68354 BZ = 8.64696 F4 =56364.9684 SUNMART STATISTICS: STD ERROR EST = R SQUARED LOC = 8.99999 8.2884 KSE = \$.66765 NSR = #.57785 E GATIO =7988.2812 B. F. (N/D) = 2/ 37 R SQUARED ACTUAL=1.04200 DUREIN-WATSON STATISTIC= 2.388326

ъ. г

SUMMARY OF PREDICTIVE ADILITY TESTS RESULTS 5 ITERS OF INTEREST + REDUCED NODEL + FULL KODEL + . . AVERACE ADSOLUTE DEVIATION . 3.84 1.11 . . + VARIANCE OF ABSOLUTE DEVIATIONS + 16.4 E.61 + TEST STATISTIC (SEE NOTE) ---13.58 . + TOTAL NUMBER OF TEST SITUATIONS + 144 144 . + NUKEER OF PREDICTIONS WITHIN SI + 138 144 + PERCENT OF PREDICTIONS WITHIN ST + 166. - 12. 8 + NUMBER OF PREDICTIONS WITHIN 181 + 144 144 + PERCENT OF PREDICTIONS WITHIN 1FT+ 166. 165. 4 KOTE: IN TESTING FOR STATISTICAL SIGNIFICANCE USE STUDENT'S T DISTRIBUTION IF THE KUMBER OF TEST SITUATIONS ARE LESS THAN LOT DIMERNISE USE STANDARD NORMAL DISTRIBUTION. IN EITHER CASE THIS IS A ONE TAILED TEST. IF THE TEST STATISTIC IS GREATER THAN THE CRITICAL STATISTIC ONE MAT CONCLUDE THAT THE AVERAGE ABSOLUTE DEVIATION OFTAINED WITH THE FULL RODEL IS SIGNIFICANTLY LESS THAN THAT OCTAINED WITH THE REDUCED MODEL. FILES LOGFILE.STOLEARK.REDHOURS.AND FULLNOOL WRITTEN.

INFUI DATA AS READ FROM FILE TESTEATA AND COUVERTED TO LOCARTHEMS INFERITATATATATATATATATATATATATATATATATATATA	******	**********	*********		• • • • • • • • • • • • • • • • • • •	**********
LINE EIRECT LAEGOR KOURTS + CLB PROD FLOT FOINT + FRODUCT/DN RATE RUMEER RATIONAL LOGARITHE + RATIONAL LOGARITHE + RATIONAL LOCARITHE 186 1868.88 3.6326209 + 58.68 1.4909729 + 2.27 6.3562259 118 683.88 2.9747155 + 175.89 2.2138381 + 3.05 6.5054687 128 641.48 2.624558 + 313.68 2.455259 + 4.94 0.6737269 138 568.68 2.7481623 + 654.68 2.4572559 + 4.94 0.6737269 148 473.69 2.6426584 + 628.88 2.7965743 + 5.33 6.7267272 159 462.69 2.644620 + 775.60 2.6722501 + 5.33 6.7267272 158 462.69 2.644620 + 775.60 2.6722501 + 5.33 6.7267272 158 462.69 2.644620 + 775.60 2.6722671 + 5.25 9.7671359 148 477.48 2.644614 + 1085.69 3.6721144 + 6.47 6.6129743 178 464.66 2.644520 + 775.60 3.672144 + 6.47 6.6129743 178 464.66 2.6462051 + 1266.66 3.1746412 + 7.66 8.615375 188 328.68 2.555539 + 1475.68 3.1746412 + 7.68 8.615375 218 328.68 2.555539 + 1475.68 3.2725417 + 7.79 6.6915375 218 328.68 2.5551593 + 2747.40 3.2225417 + 7.79 6.6915375 218 328.68 2.5551593 + 2747.40 3.242128 + 8.33 6.9266456 226 317.69 2.5697559 + 375.69 3.551625 + 9.66 4.9738749 236 313.69 2.4597554 + 3976.69 3.551625 + 9.66 4.9738749 236 313.69 2.4742143 + 4552.69 3.551655 + 9.66 4.9738749 246 397.69 2.4625736 + 3976.69 3.597446 + 11.17 1.6458532 248 298.69 2.4742143 + 4552.69 3.551653 + 1.651 1.6216227 259 384.69 2.4425709 + 4564.69 3.655538 + 12.37 1.8972697 248 298.69 2.4425309 + 4564.69 3.655538 + 12.37 1.8972697 248 298.69 2.4425309 + 4564.69 3.6755338 + 12.37 1.1895765 276 276.69 2.4425309 + 4564.69 3.6755338 + 12.37 1.1895765 276 276.69 2.4426309 + 4564.69 3.6755338 + 13.37 1.1855727 259 326.69 2.4426309 + 4564.69 3.6755338 + 13.37 1.1855727 256 236.69 2.4425309 + 4564.69 3.6755338 + 13.37 1.12551327 218 206.69 2.4425309 + 4564.69 3.97751734 + 13.36 1.12551327 219 226.69 2.4425309 + 4564.69 3.97751734 + 13.52 1.12551327 216 276.69 2.4425309 + 4564.69 3.97751734 + 13.538147 336 2276.69 2.3264545 + 11236.69 4.6124979 + 15.45 1.1255137 337 232.69 2.325488 + 1455.69 4.973479 + 15.45 1.1255137 338 256.69 2.3763979 + 9248.64 3.97648	IKFU	t cata as r	EAD FROM FILE	e testeat	A AND CONVERTED	TO LOCARITEMS
LIR FIRCH (REDW. RUMS) & COM PROB PLUT FOILT & FRUDELTION RATE MUMBER RATIONAL LOCARITHE + RATIONAL	*******	***********	111111111111111111111111111111111111111	********	************	***************
NATIONAL Countinne Countinne Countinne Countinne Countinne 186 1988.06 3.6366229 + 58.66 1.4929729 + 2.27 6.3567239 118 631.66 2.0947155 + 175.66 2.493381 + 3.65 6.3554687 126 641.67 2.642652 + 313.86 2.4557639 + 4.15 6.16537269 136 566.67 2.6426420 + 795.86 2.6576579 + 4.19 6.6537267 136 566.67 2.6446420 + 795.86 2.6276471 + 5.25 6.7677275 148 437.68 2.6446420 + 795.86 3.6721441 + 6.4776725 148 438.67 2.5465275 + 1775.69 3.1764112 + 7.66 6.615473 + 178 644.66 2.646539 + 2775.69 3.279148 + 3.3 6.027405 188 38.67 2.545275 + 1775.69 3.279148 + 3.3 6.027405 218 334.67 2.5452139 + 2474.73 3.775174 +	LINE	FINCLI LND	UN NULVES I L	JUR PROD I	FLUI FCINI 4 FA	CUUCTION NATE
146 1486.46 3.6324207 + 52.66 1.6907723 + 2.27 6.356259 119 563.62 2.9247155 + 175.60 2.243331 + 3.05 6.3554687 126 641.64 2.626583 + 313.86 2.455543 + 4.45 6.453644 136 564.66 2.7451523 + 454.65 2.791713 + 5.33 6.7267272 146 493.65 2.644626 + 775.60 2.525271 + 5.55 6.7671597 156 462.66 2.644626 + 775.60 3.671461 + 6.477 6.851976 176 464.66 2.644620 + 1266.66 3.6613473 + 6.77 6.857986 176 347.66 2.6453275 + 1775.66 3.2491983 + 7.37 6.854986 176 346.67 2.5451502 + 2972.66 3.225517 + 7.96 8.555537 216 326.68 2.5451503 + 274.68 3.2491983 + 7.37 6.854567 216 326.89 2.5451503 + 274.68 3.2551627 + 7.97 6.871557 216 326.89 <	NUMBER	VVI I ABHE	LUUMALING 4	viel 1 UNING	Lumin I ING 4 No	CIUNAL LOUANITHE
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296 276.66 2.4446446 \$959.66 3.7751734 13.38 1.1264561 366 276.66 2.4313638 4461.66 3.8182997 13.45 1.1351327 318 263.68 2.4313638 4461.66 3.8182997 13.45 1.1351327 318 263.68 2.4199557 4.972.68 3.6433574 13.78 1.1455972 326 256.68 2.4262465 7491.66 3.6745398 14.23 1.532849 326 256.68 2.3974606 6602.66 3.9874114 14.05 1.1658376 326 256.68 2.39763979 9248.66 3.9378141 14.92 1.1755118 326 239.66 2.35763979 9248.66 3.9378141 14.92 1.1755118 326 239.68 2.3716679 9648.66 3.933468 15.45 1.10454075 326 239.68 2.3579348 11831.68 4.8426149 16.35 1.2123178 326 228.66 2.3579348 11831.68 4.8426149 16.35 1.2123178 327 228.66 2	284	264.44	2.4533183 +	5458.44	3.7372335 +	12.87 1.1895785
365 276.86 2.4313638 + 6461.66 3.8182997 + 13.45 1.1351327 315 263.85 2.4199557 + 6972.65 3.8433574 + 13.98 1.1455972 326 256.66 2.4202466 + 7491.66 3.6745398 + 14.23 1.1532849 326 256.66 2.3979466 + 6682.66 3.9674114 + 14.15 1.1658376 326 256.66 2.3979466 + 6682.66 3.9674114 + 14.15 1.1658376 326 256.66 2.39783979 + 9248.66 3.9778141 + 14.98 1.1755118 326 237.66 2.3763979 + 9248.66 3.9378164 + 15.29 1.184675 326 237.66 2.3716679 + 9848.66 3.933486 + 15.52 1.1945143 326 237.66 2.3579348 + 11931.66 4.6191163 + 16.64 1.2252644 326 228.66 2.3592465 + 11526.86 4.619319 + 16.54 1.2251638 327 224.66 2.3344323 + 1227.66 4.6873199 + 16.77 1.229618 416 216.66	295	276.44	2.4446446 4	5959.44	3.7751734 +	13.38 1.1264561
318 263.88 $2.4199557 + 6972.68$ $3.6433574 + 13.98$ 1.1455972 328 256.68 $2.4262469 + 7491.66$ $3.6745398 + 14.23$ 1.4532949 338 258.64 $2.3979460 + 6688.66$ $3.9674114 + 14.15$ 1.1455376 348 245.68 $2.3979460 + 6688.66$ $3.9674114 + 14.15$ 1.1455376 348 245.68 $2.3978379 + 9248.66$ $3.9674114 + 14.98$ 1.1755118 356 239.66 $2.3763797 + 9248.66$ $3.972141 + 14.98$ 1.1755118 356 $237.66 + 2.376379 + 9248.66$ $3.993468 + 15.29 + 1.1844075$ $3.66 + 235.64 + 2.3716679 + 9848.66$ $3.993468 + 15.55 + 1.1945143$ 376 $232.66 + 2.3576348 + 14931.66 + 4.6171163 + 16.64 + 1.285264416.55 + 1.2926441.221578379224.56 + 2.3562465 + 11624.66 + 4.6171163 + 16.64 + 1.2216756460221.08 + 2.3443923 + 12227.68 + 4.6873199 + 16.97 + 1.2294618416218.66 + 2.334455 + 12838.66 + 4.1864974 + 17.27 + 1.2372922420216.60 + 2.324438 + 13549.66 + 4.164484 + 17.81 + 1.2556437416211.60 + 2.32442524 + 14337.60 + 4.164484 + 17.81 + 1.2556437416211.60 + 2.3242524 + 14337.60 + 4.1864533 + 18.61 + 1.2553137456209.66 + 2.321463 + 12654.66 + 4.1721941 + 18.22 + 1.2605440446206.68 + 2.3136472 + 51554.68 + 4.2851269 + 18.52 + 1.269845745626.64 + 2.33616364 + 16648.64 + 4.215164 + 16.78 + 1.253233478206.68 + 2.3616364 + 16654.68 + 4.2215164 + 16.78 + 1.2736956478206.65 + 2.3616364 + 16654.68 + 4.2215164 + 18.94 + 1.27364956$	365	274.86	2.4313638 +	6461. 6 8	3.8162997 +	13.45 1.1351327
328 256.88 2.4262464 + 7491.66 3.6745398 + 14.23 1.1332849 338 258.86 2.3979408 + 6608.68 3.9674114 + 14.45 1.1458376 348 245.88 2.3891661 + 8658.68 3.9378141 + 14.45 1.1458376 348 245.88 2.3891661 + 8653.68 3.9378141 + 14.98 1.1755118 356 239.66 2.3783979 + 9248.66 3.946478 + 15.29 1.1844675 346 235.68 2.3716679 + 9848.66 3.9933486 + 15.45 1.1945143 378 232.66 2.3579348 + 11831.68 4.6191163 + 16.64 1.2852844 368 228.66 2.3579348 + 11831.68 4.8426149 + 16.35 1.2125178 379 224.66 2.3562465 + 11265.88 4.8673199 + 16.64 1.2216558 468 221.08 2.3443923 + 1227.68 4.8673199 + 16.97 1.2294618 416 21.86 2.3344323 + 1227.68 4.1864974 + 17.27 1.2764627 416 21.86 2.3344327 + 13349.68 4.1254487 + 17.27 1.2772922 426 21.86 2.3244327 + 13349.68 4.1254487 + 17.21 1.2555137 436 214.66	315	263.88	2.4199557 +	6972. 68	3.8433574 4	13.98 1.1455972
338 258.58 2.3979408 + \$662.68 3.9874114 + 14.45 1.1455376 348 245.68 2.3291661 + 8453.68 3.9378141 + 14.98 1.1755118 356 239.66 2.3291661 + 8453.68 3.9378141 + 14.98 1.1755118 356 239.66 2.3783979 + 9248.66 3.9933486 + 15.29 1.1844675 346 235.69 2.316679 + 9848.66 3.9933486 + 15.45 1.1945143 378 232.66 2.3579348 + 11831.68 4.8191163 + 16.64 1.2252844 368 228.66 2.3579348 + 11831.68 4.8426149 + 16.35 1.2125178 399 224.66 2.3562465 + 11626.88 4.8673199 + 16.97 1.22761818 416 21.08 2.3443923 + 12227.68 4.8673199 + 16.97 1.22761818 416 21.08 2.334535 + 12638.68 4.1864974 + 17.27 1.237692631 426 216.66 2.3344372 + 13349.68 4.1254487 + 17.27 1.23769263 426 216.66 2.3344372 + 15454.66 4.14184 + 17.81 1.2555137 436 214.66 2.3244324 + 14337.66 4.144184 + 17.81 1.2452533 436 2	325	256.88	2.1262455 +	7491.55	3.6745398 +	14.23 1.1532849
348 245.88 2.3291661 + 8653.68 3.9378161 + 14.98 1.1755118 356 239.66 2.3783979 + 9248.66 3.9464478 + 15.29 1.1844675 346 235.68 2.3716679 + 9848.66 3.9933486 + 15.45 1.945143 378 232.66 2.3254888 + 16450.66 4.6191163 + 16.64 1.2852844 368 228.66 2.3579348 + 11931.69 4.8426149 + 16.35 1.2125178 379 224.66 2.3592465 + 11625.88 4.8673199 + 16.97 1.22761818 460 221.08 2.3443923 + 12227.68 4.8873199 + 16.97 1.27216758 416 218.66 2.3345457 + 13349.68 4.1254487 + 17.27 1.2721618 416 218.66 2.334537 + 13349.68 4.1254487 + 17.27 1.2727222 426 216.66 2.3244372 + 15454.86 4.1254487 + 17.27 1.27564537 436 214.66 2.3244324 + 14337.66 4.144184 17.81 1.255137 436 29.66 2.3261463 + 14646.66 4.1721941 + 18.22 1.265484 446 206.68 2.3261463 + 14646.66 4.1721941 + 18.22 1.265484 446 <th>336</th> <th>258.56</th> <th>2.3979400 +</th> <th>8828.88</th> <th>3.9674114 +</th> <th>14.45 1.1658376</th>	336	258.56	2.3979400 +	8828.88	3.9674114 +	14.45 1.1658376
356 239.66 2.3783979 + 9248.66 3.946478 + 15.29 1.1844075 346 235.66 2.3716679 + 9848.66 3.9933486 + 15.45 1.1945143 378 232.66 2.3654888 + 16450.66 4.6191163 + 16.64 1.2852844 368 228.66 2.3579348 + 11931.68 4.8426149 + 16.35 1.2125178 379 224.66 2.3579348 + 11931.68 4.8426149 + 16.35 1.2125178 379 224.66 2.3582465 + 11626.88 4.8673199 + 16.97 1.2216558 460 221.08 2.3443923 + 12227.68 4.8873199 + 16.97 1.2721658 416 218.66 2.334545 + 12638.68 4.1864974 + 17.27 1.2372923 426 216.66 2.334537 + 13349.68 4.1254487 + 17.27 1.2372923 426 214.66 2.334537 + 13349.68 4.1254487 + 17.27 1.2372923 426 214.66 2.324524 + 14337.69 4.14184 + 17.81 1.2555137 436 214.66 2.3261463 + 14646.69 4.1721941 + 18.22 1.265484 446 206.68 2.3138672 + 15454.88 4.1864583 + 18.61 1.285333 456 29.66	348	245.84	2.3591661 +	8629.09	3.9378161 4	14.98 1.1755118
346 235.00 2.3710677 * 9548.00 3.973380 15.65 1.1745143 376 232.60 2.3654868 16450.06 4.0191163 16.64 1.2852844 388 228.66 2.3579349 11031.06 4.8426147 16.35 1.2125178 379 224.66 2.3579349 11031.06 4.8426147 16.35 1.2125178 379 224.66 2.3582465 11626.88 4.8673197 16.64 1.2216558 400 221.08 2.3443923 12227.68 4.8673197 16.77 1.2294818 416 2.18.66 2.334545 12638.66 4.8673197 16.77 1.2294818 416 2.1.86 2.334537 13347.68 4.1254487 17.27 1.2372922 420 216.66 2.334537 13347.68 4.1254487 17.27 1.2372923 424 211.66 2.3244537 14337.66 4.14184 17.81 1.2555137 436 201.66 2.3244524 14337.66 4.1454583 18.61 1.2553137 446 206.68 <t< th=""><th>356 .</th><th>239.85</th><th>2.3783979 +</th><th>9248.88</th><th>3.966478 +</th><th>15.29 1.1644075</th></t<>	356 .	239.85	2.3783979 +	9248.88	3.966478 +	15.29 1.1644075
379 232.50 232.54858 18450.50 4.0191163 16.04 1.2852844 368 228.66 2.3579348 11831.66 4.8426149 16.35 1.2125178 379 224.66 2.3579348 11831.66 4.8426149 16.35 1.2125178 379 224.66 2.3582465 11626.88 4.8673199 16.65 1.2216758 460 221.08 2.3443923 12227.68 4.8873199 16.97 1.2296818 416 218.66 2.334545 12638.68 4.8673199 16.97 1.272162818 420 216.66 2.3345457 12638.68 4.1864974 17.27 1.2372923 420 216.66 2.334537 13349.68 4.1254487 17.51 1.2452457 430 214.66 2.3242524 14337.60 4.144184 17.81 1.255137 436 216.66 2.3242524 14337.60 4.1364583 18.61 1.2553137 436 206.68 2.3261463 14546.60 4.1721941 18.22 1.265484 446 206.68 <	365	235.84	2.3716679 +	9848.88	3.9933488 4	15.65 1.1945143
365 226.56 2.337385 11531.66 1.625176 16.33 1.6.13175 379 224.56 2.357385 11526.56 4.6654303 16.66 1.2216756 460 221.08 2.34592465 11526.56 4.6873197 16.66 1.2216756 416 21.08 2.334323 1227.68 4.6873197 16.77 1.2296818 416 21.086 2.334535 12237.68 4.6873197 17.27 1.2372923 420 216.66 2.334535 12237.68 4.6873197 17.27 1.2372923 420 216.66 2.334537 4.13349.66 4.1254487 17.27 1.2372923 420 216.66 2.334537 4.13349.66 4.1254487 17.51 1.255637 446 211.66 2.3242524 4.1337.66 4.14184 4 17.81 1.2555337 456 207.66 2.3261463 14564.66 4.1721941 18.22 1.265484 446 206.66 2.336472 1	3/9	236.99	2.3634668	11421 45		16.94 1.2532544
377 224.00 2.3372400 1102.00 4.000303 10.0003 <th10.0003< th=""> 10.0003 1</th10.0003<>	209 294	220.3V 771 68	2.33/1345 4	11531.00	1.016117 4	16.33 1.21331/8
416 218.00 2.3384545 + 12638.06 4.1864974 17.27 1.2372922 420 216.00 2.3384545 + 12538.06 4.1864974 17.27 1.2372922 420 216.00 2.3384545 + 13547.06 4.1254487 + 17.54 1.2445245 436 214.06 2.3244537 + 13547.06 4.14184 + 17.81 1.2556437 446 211.06 2.3242524 + 14337.00 4.1564583 + 18.61 1.2553137 456 207.06 2.3261463 + 14866.00 4.1721941 + 18.22 1.265484 466 206.06 2.3136672 + 15454.08 4.189439 + 18.61 1.255338 476 203.06 2.336472 + 15454.08 4.189439 + 18.41 1.2653538 476 203.06 2.3374968 + 6.408.88 4.2854289 + 18.52 1.2698457 486 206.68 <th>144</th> <th>771.88</th> <th>2.3372768 4</th> <th>17777 48</th> <th>1.9637393 4</th> <th>14.97 1.7791918</th>	144	771.88	2.3372768 4	17777 48	1.9637393 4	14.97 1.7791918
216.00 2.3344537 13347.80 4.1254487 17.54 1.2445245 430 214.00 2.3344537 13347.80 4.1254487 17.54 1.2445245 446 211.00 2.3242524 14337.00 4.1414184 17.81 1.255437 446 201.00 2.3242524 14337.00 4.154583 18.81 1.2553137 456 207.06 2.3261463 14666.00 4.1721941 18.22 1.265484 446 206.60 2.3136472 15454.00 4.1096439 18.41 1.253338 476 203.00 2.3261463 16488.00 4.205329 18.41 1.2653538 476 203.00 2.3374964 16488.00 4.205329 18.41 1.2653538 476 203.00 2.3374964 16488.00 4.205329 18.41 1.2653538 478 203.00 2.336639 164534.06 4.215164 18.70 1.2736954 479 19.40 2.2946452 17172.06 4.2345208	414	718.44	2.3364545 4	17838.44	4.1861974 4	17.77 1.2372972
436 214.06 2.3284:38 13649.06 4.14184 17.81 1.2564339 446 211.06 2.3242524 14337.00 4.1544583 18.61 1.2553137 456 209.06 2.3242524 14337.00 4.1544583 18.61 1.2553137 456 209.06 2.3261463 14866.00 4.1721941 18.22 1.2605484 466 206.06 2.3136472 15454.00 4.1894439 18.41 1.255338 476 203.06 2.3374964 16488.00 4.2054209 18.41 1.2653538 476 203.06 2.3374964 16488.00 4.2054209 18.61 1.2653538 476 203.06 2.3016306 16638.06 4.2053209 18.61 1.2659533 476 203.06 2.3016306 16638.06 4.2053209 18.61 1.2659536 478 204.06 2.3016306 4.6348.06 4.2215164 18.76 1.2736754 479 19.08 2.2964652 17172.06	428	216.44	2.3344537 4	13349.66	4.1254487 +	17.54 1.2445245
446 211.06 2.3242624 14337.00 4.1564583 18.81 1.2555137 456 209.66 2.3261463 14866.60 4.1721941 18.22 1.2605484 466 206.66 2.3136472 15454.00 4.1896439 18.61 1.255333 476 206.66 2.3136472 15454.00 4.1896439 18.41 1.2653538 476 203.00 2.3974968 16648.00 4.2054299 18.41 1.2653538 476 203.00 2.3974968 16648.00 4.2054299 18.41 1.2653538 478 203.00 2.3974968 16648.00 4.2054289 18.61 1.2659538 478 203.00 2.3974968 16648.00 4.205529 18.61 1.2659538 478 206.00 2.3016306 16654.00 4.2215164 18.70 1.2736954 479 19.40 2.2966652 17172.06 4.2345288 18.94 1.2773606	436	214.66	2.3284138 +	13649.86	4.1414164 4	17.81 1.2566639
456 209.66 2.3261463 14666.66 4.1721941 18.72 1.2605484 466 286.68 2.3136672 15454.68 4.1898439 18.41 1.265358 478 283.68 2.3374948 16448.68 4.2854299 18.41 1.2653538 478 283.68 2.3874948 16448.68 4.2854299 18.51 1.2698457 486 266.68 2.3616369 16654.68 4.2215164 18.78 1.2736954 478 19.48 2.2964652 17172.68 4.2345288 18.94 1.2773696	446	211.00	2.3242624 +	14337.44	4.1564583 +	18.41 1.2555137
466 286.68 2.3136472 15454.68 4.1896429 18.41 1.2652538 478 283.68 2.3874968 16648.68 4.2854289 18.38 1.2698457 486 268.68 2.3816366 16654.68 4.2215166 16.78 1.2732956 478 19.48 2.2964652 17172.68 4.2348288 18.94 1.2733696	456	289.66	2.3281463 4	14866.66	4.1721941 +	18.22 1.2605484
478 283.68 2.3874948 1648.88 4.2854289 18.38 1.2698457 486 268.68 2.3816369 16654.68 4.2215164 18.78 1.2736954 418 19.48 2.2964652 17172.68 4.2348288 18.94 1.2773696	468	286.68	2.3136672 +	15454.88	4.1898429 +	18.41 1.2453538
486 Z65.66 Z.3816366 + 16634.66 4.2215166 + 16.78 1.2732956 495 198.66 Z.2966652 + 17172.66 4.234528 + 18.94 1.2773866	478	253.65	2.3974948 +	16848.88	4.2854289 +	18.58 1.2698457
478 198.00 Z.Z96665Z + 1/1/Z.00 4.Z346268 + 10.94 1.Z773800	485	Z¢\$.41	Z.3816369 +	16654.66	4.2215164 +	15.78 1.2731956
***************************************	47 3 	178.8 8	£.Z96665Z	1/1/2.00	4.Z3462 48 4	IU.94 1.277 3696

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PEARSON CORRELATION COEFFICIENTS NATRII

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	RESUL	TS OF THE STAND	ARE LEARNING	CURVE RODEL	

ASE	DESERVED	FREDICTED	RESTRIAL	I CEVIATION	
1	1128.44	1636.45	51.55	4.74	
ż	873.88	727.41	75.59	9.41	
3	- 441.85	617.19	23.81	3.71	
ĩ	548.66	555.41	4.39	1.78	
Ś	473.64	5#7.39	-14.39	-2.92	
ĩ	462.66	474.25	-17.25	-2.45	
7	137.46	443.65	-6.85	+1.57	
i.	(61.68	471.54	-17.54	-4.35	
ě	34.8.44	396.77	-78.77	-7.21	
16	347.68	377.93	-38.93	-8.91	
	336.64	348.78	-38.78	-9.33	
	778 64	324 19	-26.19	-8.19	
12	317 83	222.26	-14 26	-5 14	
19	317.84	278 12	-7.12	-7.14	
14	313.88	315.03	-1.63	-6.19	
12	387.89	319.32	-1.32	-8.97	
16	394.99	307.40	3.10	1.82	
-11	Z48.80	251.44	6.36	1.20	
-18	298.88	262.61	1.39	2.35	
17	784.84	2/5.13	8.5/	3.12	
25	278.95	268.39	7.61	3.46	
Z1	276.66	262.3Z	7.68	. 2.84	
22	. 263.60	Z56.74	6.26	Z.38	
23	256.28	251.58	4.4Z ·	1.73	
24	250.23	246.26	3.74	1.56	
25	245.85	241.56	3.44	1.46	
26	239.05	237.44	1.96	1.82	
27	235.88	232.86	2.14	\$.91	
28	232.46	228.99	3.61	1.30	
2 7	228.55	225.52	2.48	1.49	
35	224.05	222.19	1.81	6.81	
Л	221.55	219.65	1.95	£3.2	
3Z	218.65	214.65	1.95	F.89	
- 33	216.55	Z13.68	2.32	1.47	
34	214.25	211.47	2.53	1.18	
35	211.65	289.41	1.59	6.75	
- 34	209.28	287.28	1.72	S.82	
37	264.85	285.82	5.98	1.48	
38	283.55	202.85	4.15	1.11	
39	207.65	265.73	-1.73	-1.37	
- 46	195.68	199.66	-1.66	-1.51	
444		***********		***************	***********
THE	EQUATION FOR	THIS NOCEL IS:	THAT =	84 + I1 ++ B1	
. 18	LOC FORM THIS	KODEL DECOMES:	LOC(THAT) =	LOG(68) + 81 + LOG	(11)
IME	RE: LOC(88)	3.49572 STB	ERROR = 4.13	1455 BB = 3131 .1	(684
	B1 1	-8.28262 STB	ERROR = 0.61	433	
SUM	MART STATIST	ICS:			
R \$	OUARED LOC	=8.99115	STD ERROR	EST = \$.6164	
ISE		= Ø.#êê27	HSR	* 1.14398	
FF	ATIO	+4255.4885	8. F. 18/8)} ≠ 1/ 30	
. 8 5	QUARED ACTUA	L=#.98091	LEARKING FA	CTOR = 82.28945 PE	RCENT
505	EIN-WATSON S	TAT 1511C+ 8.3277	53		
- 684		*********	*********		*************

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	27 312 TR	OF PECEFSEION OF	FROMUTION I	ATE MERIAPIE ALON	5
		******************		*****	~ ***********
******	ARCCOUTS	800010708	PF # 1 111	* RFULLTIAN	****
LASE	ULSENICU	TNEUSCIEB	NEDIUME	A DEVIMINUM	
I	1255.28	9/4.84	113.16	18.48	
Z	E33.64	628.64	144.96	16.85	
3	641.06	594.83	_S€.17	7.83	
4	564.48	546.65	13.05	2.38	
5	493. 68	516.61	-23.61	-4,79	
- 6	462.40	462. e 4	-28.84	-4.34	
7	437.65	447.24	-16.24	-2.34	
ŝ	424.68	435.28	-31.28	-7.74	
÷	345.61	471.84	-53.64	-14.42	
16	347.84	405.94	-55.94	-16.99	
11	238 84	700 51	-59.51	-18.64	
11	276 44	307.JT 978 18	-54 14	-15 81	
12	328.88	3/7.60	- 38.68	-10.01	
14	317.00	347.29	-38.27	-1,30	
14	313.89	326.98	-13.15	4.00	
15	384.88	311.74	-2.14	-8.67	
16	394.65	297.93	6.87	2.25	
·17	298.66	266.62	11.98	4.62	
- 18	298.89	276.15	13.85	4.77	
19	284.65	268.13	15.87	5.59	
29	278.85	268.49	17.51	4.36	,
21	278.88	256.65	13.35	4,95	
22	263.85	252.13	16.87	4.13	
73	754.46	748.57	7.18	2.84	
71	256 64	243.54	4.56	2.48	
10	715 44	120 58	5 58	2 25	
23	273.99	105 67	2.50	1 71	
20	231.00	(33.87	3.13	4.35	
27	Z35.95	731.63	4.17	1.33	
28	Z3Z.80	227.62	4.38	1.67	
29	ZZ8.88	774.49	3.40	1.38	
36	224.66	221.29	z.71	1.21	
31	221.00	218.27	2.73	1.23	
32	218.95	215.45	z.55	1.17	
33	216.88	212.79	3.21	1.48	
34	214.88	218.57	3.43	1.66	
25	211.60	298.83	2.17	1.63	
34	749.64	747.43	1.97	6.94	
27	241 68	715.11	8 54	6.77	•
31	243 44	741 41	-1 41	-6.51	
		447 17	-1.57	-1 71	
37	(11.11	(¥L.4L Ad: 18	-2.76	-1 60	
49	198.39	291.13	3.13	•1,97	
414	*******		*************	**************************************	*********
THE	EQUATION FOR	R THIS RODEL IS:	THAI =	50 4 12 44 82	
IN I	LOC FORM THIS	S MOUEL BECOMES:	LOC(THAT) .	LOGISET + EZ 4 LOG	1121
THE	RE: LOC(BS)	= 3,25374 STB	EKROR = 0.23	1757 BV = 1793.5	4775
	32	-9.74392 573	ERROR = 1.62	175 .	
SUR	RARY STATIST	ICS:	•	•	
R S	OUARED LOC	=0.96854	STB ERROR	EST = 0.0307	
328		= 8.624 96	KSR	.= 1,11788	
1.1	110	=1169.7958	9. F. (N/I) = 1/ 28	
2 4	QUARED ACTUR	L+8.95479			
Bui	BIN-WATSON S	TATISTIC: 8.277	25		
414		************	*********		***********

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***** 2	1111111111111 RESULTS OF C	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	141444444444444 197 FRODUCTION	AND PRODUCTION RATE	********* Rozel
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ASE	GESERVED	GETCICIED	RESIDUAL	1 DEVIATION	
1	1692.66	1455.13	-1.13	-6.61	
2	253.68	£#3.15	-1.15	-1.12	
3	641.00	648.73	£.27	6.61	
4	566.68	56£.f9	-1.93	-£.f2	
5	493.68	492.67	\$.33	1.67	
4	462.00	461.92	8.18	\$.52	
7	137. 6 0	437.15	-1.15	-8.82	
8	4e: ee	484.12	-1.12	-1.13	
•	368. #	368.24	-8.24	-1.17	
14	347.68	347. # 4	-1.14	-1.tl	
11	33f. 6 f	329.59	\$.41	¢.12	
12	328.60	319.59	f.41	6.13	
13	317.65	317.5	-6.56	-\$.16	
14	313.66	313.28	-5.28	-1.69	
15	399.00	. 328.97	8.83	6.61	
16	324.66	344.32	-1.32	-4.16	
17	298.85	297.89	F. 11	8.84	
18	298.EB	298.45	-8.45	-4.15	
11	284.68	283.75	B.25	8.89	
21	278.00	278.21	-8.21	-1.17	
21	278.88	269.56	8.44	5.14	
22	263. FB	262.85	£.2 9	· 1.68	
23	256. 68	255.53	5.47	Ø.18	
24	25f.\$#	258.29	-\$.29	-6.11	
25	245.00	244.84	€.16	£.\$7	
26	239 .8 7	239.34	-1.34	-6.14	
27	235.FØ	235 .8 7	-6.07	-6.63	
28	232.00	231.63	£.37	6.16	
29	228.68	227.91	4.49	£.64	
31	- 224.68	224.38	-1.38	-1.17 .	
31	221. 89	221.13	-8.13	-1.15	
32	218.99	217.97	1.43	1.62	
33	216.08	215.95	1.45	1.12	
34	Z14.68	213.78	1.22	. F.16	
35	211.69	Z11.38	-1.38	-4.18	
36	Z89.00	Z#8.88	E.12	5.56	
37	296. 99	Z25.88	8.1Z	5.56	
38	283.98	(EL.83	E.13	8.8/	
JY	299.50	289.29 107 07	-0.20	-9.19	
49	i 75.99	17/.7/ 	8.83 	\$.71 	*****
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UNICE	S: 100/241	1000CC 0000000		L 26 2 5177.9111	
e min	<u>1</u> 1	-8.59957 ST	ERROR = 4.641	14 Fi s44537.21M	
	£7 :	172 194494 ST	EREAR = 4.442	SA F4 :51281.0141	
Sinc	SART STATIST	ICS:			
1 54	WARED LOC	26.97999	STO ERROR F	ST : 8.8884	
KSE		* \$.58245	NSR	1 4.57785	
FR	TIO	=7968.2812	D. F. (N/D)	* 2/ 37	
R SA	NARED ACTUA	L=1.64238			
DUR	BIR-VATSON S	TATISTIC: 2.300	326		
4444		**********		*****************	******

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4 4 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	1454 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	++++	1 5 8 5 8 5 8 5 8 5 8 5 8 5 8 5 8 5 8 5 8	++++ ++++ PRE	**** **** D1C ***	THE ++++ RE +++++ TIG +++++ .23	+++++ DATI +++++ DUCE +++++ 1 + Z +++++ +	++++ A FS ++++ B ((++++ DE) ++++	ESE/ 	++++ {TED ++++ NIKC ++++	E = 1 E = 1	SHO LO4 HIHH HRVE EST HHH	**** RTR/ IS **** 1 KG **** 20	++++ INCE FOR ++++ INCE ++++ INCE ++++ +++++ +++++	HAAA E PR 2 CA 1444 ES1 1444	14+4+ 12DIC 15E - F 14+4+4 1 B1 14+4+4 28244	1112 39 11414 114 114 114 114 114 114 114 114	+++++ ADJL VHICH FUL FUL FREDI +++++ FREDI +++++	5++++ ITT C RAS F++++ L (CU +++++ CTION 6++++ 8-21	5554 ONFA AX Q 1444 902A 4455 1 4 1 4445 3	4.4444 RISO 858RV 858RV 11VE 44444 11VE 44444 10EV 10EV	FED N FED N FROM FROM FATIO	ALUE ALUE H++++ DUCT I H++++ DN + H++++ H	••••• GF: •••• OX C •••• EST •••• 567	24 ++++ FRC ++++ EØ ++++ 1.21	• • • • •	11 54 19 11 G2 16 44 EST 1 5 5 5 5 5 5) + 8 = 4 RAT. 84 5 B B1. 84 7 B	++++ E) H ++++ E ES 2+++ 2 #.	++++++ ODEL +++++ 54673	13 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8
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l . ·	SHORTRANCE PREDICTIVE	ACILITY COMPANISON	•
THE DATA PRESENTE	D DELOY IS FOR CASE # 33	WICH HAS AN ARCEPTER VALUE	NE: 214 48 4
E & A PERMER (LEBENTA			
		FULL (CONSERTIVE FRUDGETT	UN & PROBUCITON NATED RODEL +
	**********************	************************	**************************
· USED + FREDICITUR + 2 DEVIATION	+ ESI BU + ESI BI ++	REDICTION 4 I DEVIATION 4	EST ER + EST BI + EST EZ + .
***********************************	*******************		*************************
• 37 + 213.14 + 1.33	+ 3151.43 +-4.28357 ++	215.94 + 5.63 +	5671.#3 +-#.59937 + #.84639 +
• · 31 + 212.95 + 1.41	+ 3158.24 +-\$.26389 ++	215,94 + 6.83 i	5671.17 +-#.59937 + #.84L37 +
ŧ36 → 212.74 → 1.51	+ 3165.76 +-4.28424 ++	215.95 + 5.63 +	5678.86 1-8.59928 1 8.84643 1
+ 29 + 212.51 + 1.41	+ 3173.66 +-4.22462 ++	215.98 + 4.81 +	5449.98 +-6.55943 + 6.8447; +
4 28 4 212.21 + 1.76	4 3184.44 +-#.28513 44	715 97 4 4 81 4	5474 #5 4.# 59941 A # 01444 A
a 77 á 711.88 a 1.94	4 2100 14 4-4 2020 44		2178 12
	1 3216 LL 1_8 90130 ···		JO/8.13 - 8.37738 4 8.84417 4
	* 3/18.00 ***./2636 **	213.74 + B.83 +	3664.48 1-8.34438 1 8.84623 1
	* 3224.28 ***.28/82 **	ZIS.98 4 8.81 4	5669.57 1-8.59948 1 8.84663 1
26 219.49 2.59	+ 3244.48 +-8.28799 ++	Z15.96 + 5.8 2 +	5669.29 +-8.59932 + 8.64635 +
* 23 + 269.65 + 2.94	+ 3268.45 +-E.28914 ++	216.66 + -6.66 +	5669.51 +-#.59947 + #.8469# +
* 22 + 228.71 + 3.38	+ 3278.29 +-8.29858 ++	215.75 + 0.83 +	5468.78 +-8.59928 + 8.84597 +
4 21 4 287.37 + 3.99	+ 3339.76 +-#.29256 ++	215.91 + 6.84 +	5447.97 +-8.59982 + 8.54537 +
*******	******************		141444444444444444444444444444444444444

SKARTRANCE PREDICTIVE ABILITY COMPARISON	i
• INE GATA FREELATED BELOW IS FOR CASE # 32 WHICH HAS AN OBSERVED VALUE OF: 2	18.27 4
4 \$ REDUCED (LEARNING CURVE) MODEL 44 FIRI (CURPER STRYE FROM: 1 FROM	DUCTION RATE) KOCEL (
• CASES •••••••••••••••••••••••••••••••••••	******************
* USED * PREDICTION * I DEVIATION * EST B# * EST B1 ** PREDICTION * I DEVIATION * EST B#	+ EST B1 + EST BZ +

+ 31 + 215.32 + 1.23 + 3158.24 +-8.28389 ++ 217.95 + 8.62 + 5671.17	+-4.57937 + 4.84637 +
3 3 3 2 15.11 4 1.33 1 3 165.76 1 6 .72424 14 2 17.96 4 6 .62 4 5676.86	+-#.59936 + #.84643 +
	4-8.34943 + 8.646/1 +
T LO T (14.36 T 1.37 T 3164.44 PT8.46313 TT (17.77 T 8.88 T 367.45) R 27 A 214.36 A 1.75 A 2169 16 4.6 25578 AA 217 96 A 6 62 -4 5626 15	1-E,J)741 * 8.64964 * 4.6 59976 1 8 91119 1
4 24 4 213.51 4 1.92 4 3216.54 3-8.28138 43 217.96 4 8.62 4 5449.98	4-8.59938 4 8.84623 4
4 25 4 213.48 5 2.11 + 3224.28 +-8.26762 ++ 218.68 4 5.68 + 5669.57	4-8.59948 + 8.84663 +
# 24 # 212.78 # 2.44 # 3244.44 +-8.28799 +# 217.98 # \$.81 # 5669.29	1-8.57932 + 8.64635 +
4 23 4 212.63 4 2.74 4 3268.45 4-8.28914 44 218.62 4 -8.61 4 5669.51	1-8.59947 + 8.84698 +
8 22 8 211.09 4 3.17 8 3296.29 1-8.29658 +8 217.96 4 8.02 8 5668.78	+-E.59928 + 8.84597 +
+ 21 + 269.77 + 3.78 + 3339.74 1-8.29256 ++ 217.93 + 6.43 + 5667.92	! +-₽.5?9#2 + €.84537 +
• 26 • 265.84 • 4.57 • 3393.69 • • • 27513 • • 217.84 • • • • • • • • • • • • • • • • • • •	1 4-8,59848 4 8.84339 4
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The second secon	******
THE DATA PRESENTED BELOW IS FOR CASE & 31 WHICH HAS AN OBSERVED VALUE OF: 2	221. 56
Image: Short care of the state of	221.56 • • 10441444444444444444444444444444444444
Image: Short rake in the state of the s	221.56 • • DDUCTION RATE) ROBEL •
Image: Short rake in the state in the s	4 221.56 0DUCTION RATE) ROBEL + 551 St + EST S2 +
Image: Short Rakge fredictive ability comparison Image: Short Rakge fred	221.56 0DUCTION RATE) ROBEL + 0DUCTION RATE) ROBEL + 0EST &1 + EST &2 +
Image: Short Rakes predictive ability comparison Image: Short Rakes pred	221.56 4 DDUCTION RATE) ROBEL 4 4 EST E1 6 EST E2 4 e.5.593S 6.6443
Image: Short Rakge Fredictive Ability Comparison Image: Short Rakge Fred	221.56 4 DDUCTION RATE: ROBEL * EST E1 EST E2 * 4.5.5993S \$.6.6443 * 4.5.5993S \$.6.84671
Image: Short Rakge Fredictive Ability Comparison	4 221.56 4 221.56 4 221.56 4 5 221.56 5 5 5 5 5 5 5 5 5 5 5 5 5
Image: Shipe in the second s	4 221.56 4 221.56 4 221.56 4 221.56 4 221.56 4 221.56 4 221.57 5 5 5 5 5 5 5 5 5 5 5 5 5
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Image: Shipe in the second s	4 221.56 4 221.56 4 5000CTION RATE: 6 6 7 6 7 6 6 7 7 7 7 8 8 9 9 9 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 11 11 12 12 13 14 14 15 15 16 17 18 18 19 10 10
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ILITT TESTS RESULTS # ANALYSIS FEBULED ROSEL + FULL RODEL +
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÷	79878	- i	164.9 4	119.4 6	137.7 +	14.5 4	154.7 #	142.7 4	164.5 4	192.2 4	282.8 4
	29192		146.5 4	119.2 +	131.7 +	144.6 +	154.1 +	145.1 +	179.9 +	191.5 + -	283.6 +
	29324		156.1 1	118.8 +	131.3 +	113.5 +	155.4 +	147.5 +	179.2 +	198.8 +	282.3 +
4	Z9535	\$	185.7 +	118.4 +	136.6 +	143.4 1	155.4 +	166.9 4	178.6 4	198.2 +	281.6 4
	29797	4	15.11	118.4 +	138.4 +	142.5 4	154.5 +	146.3 +	178.5 4	189.5 +	223.1 +
:	25879				127.7 4	142.8 4	154.8 +	162.14	172.6.2	100 7 4	100 6 4
1	38830		184.0 1	112.8 8	121.3 4	141.0 *	157.4 4	163.6 4	176.2 4	167.6 4	192.1 4
-	32394		143.5 4	114.4 +	128.4 #	148.4 4	152.4 4	144.1 9	175.4 +	124.9 +	198.2 4
ŧ	32566		123.6 +	114.8 +	122.1 +	148.1 4	151.9 4	163.5 4	175.4 4	166.3 1	197.5 +
٠	38737		183.2 +	115.4 +	127.7.4	151.6 4	151.4 #	143.8 +	174.4 +	185.7 +	196.9 +
4	32989	+	182.9 +	115.2 +	127.3 +	139.2 +	158.9 +	142.4 4.	173.8 +	165.1 +	196.2 +
1	31881		182.5 1	114.5 *	126.7 4	138.7	158.4 4	161.7 4	173.2 4	107 0 4	192.3 4
1	31233		182.2 *	114.1.4	128.4 4	130.3 *	14747 4	146.8 4	877.1 4	163.2 4	196.3 4
	31594		16125 4	113.7 +	125.6 4	137.3 4	146.9 +	141.3 +	171.5 4	152.4 +	113.6 +
	31768		101.2 4	113.3 +	125.2 +	134.9 +	145.4 1	159.8 +	171.0 4	182.8 +	193.6 +
	31939	- 4	181.7 4	113.4 +	124.8 +	136.5 +	147.9 #	159.3 +	178.4 +	181.5 +	192.4 +
4	32111		189.6 +	112.4 +	124.4 +	134.6 +	147.5 +	156.7 +	169.9 4	168.9 4	191.8 +
•	37763		149.2 4	112.2 4	124.8 4	135.4 4	147.5 +	156.2 +	147.3 1	156.3 4	- 141-1 4
	36433			111.1 4	123.8 4	133.2 *	14613 4	157.7.4	146.6 *	179.2 4	199.9 4
	12791		• • • • 3 •	111.2 4	122.8 4	131.3 1	145.4 4	154.7 +	147.7 4	178.4 4	159.3 +
	32976		99.5 4	118.8 +	122.5 +	133.7 4	145.1 +	154.2 +	167.2 +	178.5 4	188.7 +
	33141	- 1	98.7 +	116.5 +	122.1 +	133.5 4	144.7 +	155.8 +	144.7 +	177.5 +	108.2 4
ŧ	33313	b 4	98.4 +	118.1.4	121.7 +	123.1 +	144.2 4	155.3 +	164.2 4	176.9 +	187.6 +
	3348	5 (18.14	169.8 +	121.3 +	132.7 +	143.8.4	154.8 +	145.7 +	176.6 4	167.6 +
•	33451		97,84	197.5 4	121.8 4	132.2 *	143.4 4	124.3 4	165.Z 4	175.8 4	156.4 4
	3382		· • • • •	187.1 4	178 9 4	131.5 4	142.7 4 149 K #	163 1 4	161.6 *	172 1 1	163.7 5
	2417	2 1	· • • • • • •	141.5 +	119.9.4	121.4 4	142.1 4	152.9 4	143.7 4	174.2 4	184.7 4
	3430		14.6 1	148.2 1	119.5 +	134.7 +	141.4 +	152.5 +	143.2 +	173.7 +	184.2 +
1		++++		4444444444	4454145455	*******		*******			+++++

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NUTE: 1. FROJECTED VALUES FOR DIRECT LABOR NOURS MAY BE READ FROM THE ADOVE MATRIX BY MAILEN FORMATIVE WHITE AND READING THE VALUE FOR DIRECT LABOR MOURS FOUND AT THE INTERECTION OF THE CORESEMBLIER ROW AND COLUMN. FORECASTING MORE IS THE CURLATIVE PRODUCTION AT FLOWED AT THE INTERECTION AND FORMATIVE UNITS IS IS OF THE LAST DESERVED VALUE OF CURLATIVE UNITS. 2. FROJECTION INTERVAL FOR CURULATIVE UNITS IS IS OF THE LAST DESERVED VALUE OF CURLATIVE UNITS. 3. FROJECTION VALUES FOR FRODUCTION RATE ARE 76, 86, 96, 186, 116, 128, 136, 144, AND ISB FERCENT OF THE LAST DESERVED VALUE OF FRODUCTION RATE.

6. 1. 1

****		***			********	*******		*******			*******
					FROJECTION	456 SENSI 44444444444	IVIII 82181	1			4
Fi	OUTETER	4				PROJECTED P	RODUCTION N	2125			+
CU	UL TIVE			*********	*********	********	*********	********	**********		******
) 	UNITS	4 	13.76 +	13.13 • ••••••	17.25 4 ********	18.74 4 	76.63 +	22.73 4	Z4.6Z +	[L_52 +	28.41 4
••••	17343	1	145.5 +	142.9 +	128.8 1	154.8 +	213.3 +	279.7 +	245.6 +	261.7 4	277.4 4
1	17515		144.6 +	141.9 +	178.9 +	195.6 +	212.1 +	228.3 4	24.3 4	248.1 +	275.8 +
	17487	+	143.6 +	141.4 +	177.4 4	194.5 +	218.8 4	727.8 1	212.9 4	258.4 +	274.2 +
•	17658	•	143.6 +	144.1 +	176.9 +	193.4 +	289.6 +	225.7 +	241.5 +	257.1 +	272.4 +
	16436	•	142.1 4	155.2 4	175.7 4	177.3 4	285.4 4	224.4 +	249.1 4	255.7 +	271.8 +
	16414		141.5 4	157.4 4	173 0 4	198 1 4	281.2 4	- 223-1 # A	238./ 4	234.2 4	247.3 4
	18545	i	131.8 4	154.5 +	172.9 4	187.6 4	264.9 6	228.4 1	226.1.4	751.4 4	244.5 4
	1\$717	1	129.8 +	155.4 +	172.8 +	152.7 +	213.8 +	219.6 +	234.8 +	254.0 1	245.4 +
ŧ	15527	4	123.2 +	154.8 +	171.5 •	187.8 +	282.7 +	Z18.Z +	233.5 +	248.6 4	263.6 +
•	17868	•	137.5 4	153.9 4	178.1 +	184.9 1	281.4 +	217.8 +	232.2 +	217.3 +	262.2 4
•	19232	*	134.7 4	153.1 4	167.2 4	153.51	ZFE.5 4	215.9 4	731.8 4	246.0 +	268.8 4
	175 95 1 957 4		136.7 *	151 5 A	106-J # 167 £ A	183 6 4	192 4 4	719.74	229.8 4 779 6 A	244.7 4 4	237.4
i	19747		134.4 4	154.7 +	144.5 1	182.1 >	197.4 +	212.5 4	227.4 4	742.1 +	254.7 4
1	17717		123.9 4	149.9 +	145.7 1	121.1 +	196.3 +	Z11.4 +	226.2 +	248.6 +	255.3 4
•	28691		133.2 +	149.2 +	164.8 +	185.2 +	195.3 +	216.3 +	225.8 +	239.6 +	254.8 4
	28262		132.5 +	148.4 +	164.8 +	179.3 +	194.2 +	289.2 +	223.9 4	238.4 4	252.7 +
	28434	+	131.9 +	147.7 4	143.1 •	178.4 +	193.4 +	268.2 +	222.8 +	237.2 +	251.5 +
:	28270	+	131.2 4	146.7 4	166.3 4	174 4 4	192.4 4	787.1 4	221.4 4	236.8	228.2 4
	74969		179.9 1	145.5 4	122.7 4	175.7 4	196.5 4	285.1.4	219.5 4	231.8 1	217 7 4
4	21121		129.3 +	144.8 4	157.9 4	174.9 1	169.6 4	244.1 4	218.4 4	232.5 4	246.5 +
4	21293		128.6 +	144.8 4	159.2 +	174.8 4	188.6 +	283.1 4	217.3 +	231.4 4	245.3 +
ŧ	21444	ŧ	128.E +	143.4 4	158.4 4	173.2 +	187.7 +	292.1 +	216.3 3	238.3 ×	244.1 +
•	21636	•	127.4 +	142.7 +	157.1 +	172.4 +	184.8 1	251.1 +	215.2 +	229.2 +	243.8 +
•	21564	1	126.8 4	142.8 *	156.9 4	171.5 4	181.54	Z#F.Z +	Z14.Z +	278.1 4	241.8 4
	77+81	-	125.4.4	144.7 4	155.4.4	149.9.4	163.1 4	192 3 4	213.2 + 717 7 ±	276 4 4	270 1 4
÷	22323	i	125.1 4	148.6 4	154.7 4	147.2 +	102.4 4	197.4 4	211.2 +	221.9 +	238.5 +
4	22475		124.5 +	139.4 4	154.8 4	168.4 4	162.5 +	196.5 +	216,3 +	223.9 4	237.4 +
•	22667	ŧ	123.5 4	136.7 +	153.3 +	167.6 >	121.7 +	195.4 4	289.3 4	222.9 +	236.3 +
•	22636	•	123.4 +	138.1 +	152.6 +	146.9 +	181.7 4	194.7 +	288.4 +	221.9 +	235.2 +
•	23819	!	172.8 +	137.5 +	151.7 +	166.1 +	165.1 4	173.8 4	287.4 4	228.9 4	234.2 4
-	23252		121 7 4	130.7 4	131.3 4 158.4 A	162.4 4	178.5.4	197 1 #	256.3 1 785 L A	718 4 4	233.1 4 777 1 A
i	23525		121.2 4	135.7 4	149.9 4	163.4 +	177.7 +	191.2 #	281.7 4	218.8 4	231.1 #
÷.	23497		125.7 +	125.1 4	147.3 +	147.2 +	176.9 +	198.5 +	283.8 4	217.5 4	230.1 +
	23549		126.1 +	134.5.4	148.6 +	142.5 +	176.2 +	187.6 4	252.7 +	216.1 +	- 229.1 +
r	24545		119.6 4	133.9 +	148.6 +	161.8 +	175.4 +	121.2 +	292.1 4	215.2 4	728.1 +
8,	24212	•	119.1 4	133.4 +	147.4 +	141.1 +	174.7 +	188.5 4	281.2 +	214.2 4	727.1 +
	24 36 4 92568	4	118.4 4	197 1 4	146.64	150 0 4	173.7 4	187.2 4	258,4 ¥	Z13.3 4	226.2 4
	24721		117_4 4	121.7 +	145.5 4	159.1 4	177.5 +	185.7 4	198.7 A	211_4 #	221.3 4
ě.	24899		117.1 •	131-2 +	144.9 4	158.4 +	171.8 +	184.9 4	197.9 4	216.7 +	223.4 4
۴.	25471		114.6 +	136.6 4	144.3 +	157.8 +	171.6 1	184.1 +	197.5 4	287.8 +	222.4 +
£:	25242		116.2 +	128.1 +	143.7 +	157.1 +	176.4 4	is3.4 +	196.2 1	289.8 +	221.5 +
4	25414	•	115.7 +	129.4 1	143.1 4	154.5 +	169.7 +	182.4 +	195.4 4	211.1	228.6 4
ų,	25566		335.2 4	327.5 4	, 142.6 4	133.7 1	147.9 +	181.7 4	174.7 4	287.3 \$	Z14.7 4
- 1 H	16162 62168888	****	* 4 ,*!; }********	166.3 * 1644444444	******	* 4.55.5* 11489999999	* 6,600	* <u>3</u> .191	* 7.675 *******	******	******
10	K: 1.	PROJ	ECTED VALUE	S FOR BIRECT	LACOR HOUR	S MAT BE RE	AB FROM THE	ADOVE NATE	IT BE MATCH	ING & CIVEN	PRODUCTION
88	72 0174			AC CHARGE & C 11/	e imitte art	OF LATINE TO	P 1101 10 P 000	810707 1 48			1410 000011

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WITE WITE AGREEN OF COMPLATIVE UNITS AND REACING THE VALUE FOR DIRECT LACOR HOURS FOUND AT THE INTERSECTION OF THE CORESPONDING ACH AND COLUMN. FORECASTING HOBEL IS THE CUMALATIVE PRODUCTION & PRODUCTION RATE MODEL. 2. PROJECTION INTERVAL FOR CUMULATIVE UNITS IS 13 OF THE LAST ORSERVED VALUE OF CUMULATIVE UNITS. 3. PROJECTION VALUES FOR PRODUCTION RATE ARE 78. BD, 96. 186. 116. 126. 126. 146. AND ISO PERCENT OF THE LAST DESERVED VALUES FOR FRODUCTION RATE.

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A CARLEN STREET

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SELECTED BIBLIOGRAPHY

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A. REFERENCES CITED

- 1. Alchian, Armen A., and William R. Allen. <u>University</u> <u>Economics</u>. Belmont CA: Wadsworth Publishing Company, Inc., 1964.
- 2. Allen, Scott C., USAF, and Captain Charles M. Farr, USAF. "An Investigation of the Effect of Production Rate Variation on Direct Labor Requirements for Missile Production Programs." Unpublished master's thesis, LSSR 42-80, AFIT/LSGR, Wright-Patterson AFB OH, 1980. AD-A094446.
- Asher, Harold. "Cost Quantity Relationships in the Airframe Industry." Unpublished research report No. R-291, RAND Corporation, Santa Monica CA, 1956.
- 4. Clark, Donald S., and Thomas F. McNeil. <u>Cost Estimating</u> <u>and Contract Pricing</u>. New York: American Elsevier <u>Publishing Company</u>, Inc., 1966.
- 5. Cochran, E. B. <u>Planning Production Costs: Using the</u> <u>Improvement Curve</u>. San Francisco: Chandler Publishing Company, 1968.
- Congleton, Captain Duane E., USAF, and Major David W. Kinton, USAF. "An Empirical Study of the Impact of a Production Rate Change on the Direct Labor Requirements for an Airframe Manufacturing Program." Unpublished master's thesis, LSSR 23-77B, AFIT/LGSR, Wright-Patterson AFB OH, 1977. AD-A052720.
- Crozier, Captain Michael W., USAF, and Captain Edward J. J. McGann, Jr., USAF. "An Investigation of Changes in Direct Labor Requirements Resulting from Changes in Aircraft Engine Production Rate." Unpublished master's thesis, LSSR 22-79B, AFIT/LSGR, Wright-Patterson AFB OH, 1979. AD-A077649.
- 8. Ildertton, Robert Blair. "Methods of Fitting Learning Curves to Lot Data Based on Assumptions and Techniques of Regression Analysis." Unpublished master's thesis, George Washington University, Washington DC, 1970. AD-A011583.
- Johnson, Gordon J. "The Analysis of Direct Labor Costs for Production Program Stretchouts," <u>National</u> <u>Management Journal</u>, Spring, 1969, pp. 25-41.

- Large, Joseph P., Karl Hoffmayer, and Frank Kontrovich. "Production Rate and Production Cost." Unpublished research report No. R-1609-PA&E, RAND Corporation, Santa Monica CA, 1974.
- 11. Neter, John, and William Wasserman. <u>Applied Linear</u> <u>Statistical Models</u>. Homewood IL: Richard D. Irwin, Inc., 1974.
- 12. Orsini, Captain Joseph A., USAF. "An Analysis of Theoretical and Empirical Advances in Learning Curve Concepts Since 1966." Unpublished master's thesis, GSA/SM/70-12, AFIT/SE. Wright-Patterson AFB OH, 1970. AD-875892.
- 13. Ostwald, Phillip F. Cost Estimating for Engineering and Management. Englewood Cliffs NJ: Prentice-Hall, 1974.
- 14. Smith, Lieutanant Colonel Larry L., USAF. "An Investigation of Changes in Direct Labor Requirements Resulting from Changes in Airframe Production Rate." Unpublished doctoral dissertaion, Department of Marketing, Transportation and Business Environment, University of Oregon, Eugene OR, 1976. AD-A926112.
- 15. Stevens, Captain David Y., and Captain Jimmie Thomerson, USAF. "An Investigation of Changes in Direct Labor Requirements Resulting from Changes in Avionics Production Rate." Unpublished master's thesis, LSSR 11-79-A, AFIT/LSGR, Wright-Patterson AFB OH, 1979. AD-A926112.
- 16. U. S. Department of Defense. <u>Armed Services Procure-</u> <u>ment Regulation Manual</u>. (ASPM No. 1). Washington: Government Pringing Office, September, 1975.
- 17. Wonnacott, Thomas H., and Ronald J. Wonnacott. <u>Intro-</u> <u>ductory Statistics for Business and Economics</u>. 2d ed. New York: John Wiley and Sons, 1977.

A Startes

B. RELATED SOURCES

- Brockman, Major William F., USAF, and Major Freddie D. Dickens, USAF. "Investigation of Learning Curve and Cost Estimation Methods for Cargo Aircraft." Unpublished research paper, SGM/SM/67-2-7, AFIT/SE, Wright-Patteron AFB OH, 1967. AD-665464.
- Hale, Jack R. "Learning Curve: Analyzing Major Program Changes." Working paper, AFIT/LSG, Department of Special Management Techniques, Wright-Patterson AFB OH, 1973.

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